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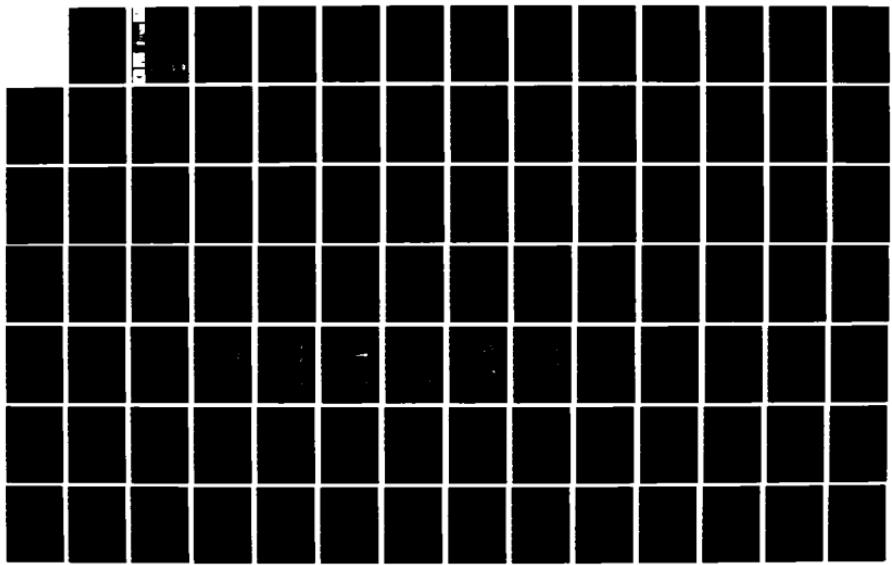
WAVE CLIMATOLOGY STUDY FOR LUDINGTON HARBOR MICHIGAN  
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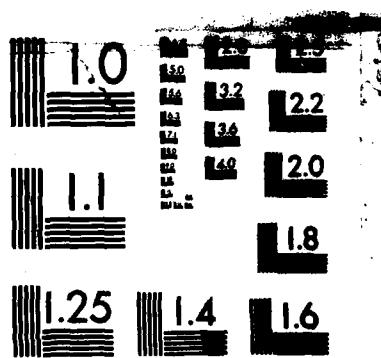
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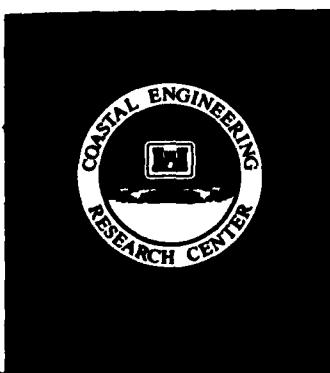
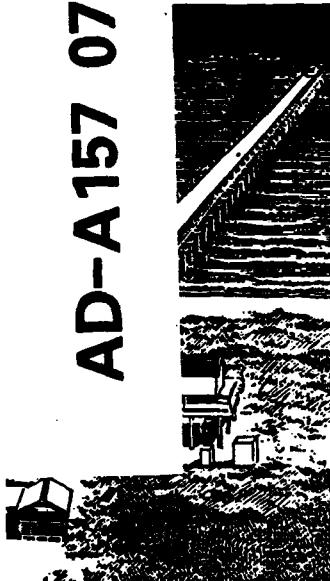


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US Army Corps  
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MISCELLANEOUS PAPER CERC-85-7

# WAVE CLIMATOLOGY STUDY FOR LUDINGTON HARBOR, MICHIGAN

by

George M. Horsham

Coastal Engineering Research Center

DEPARTMENT OF THE ARMY  
Waterways Experiment Station, Corps of Engineers  
PO Box 631  
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June 1985  
Final Report

Approved For Public Release; Distribution Unlimited



Prepared for

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Two wave gauges were located at Ludington Harbor, Michigan, from May 1983 to December 1984. The objective of the study was to determine the relationship of wave action in the harbor with wave action occurring in Lake Michigan. One gauge was located in Lake Michigan just outside the harbor; the other was located in the interior channel near terminal number 1. Concurrent wind data were obtained at the Ludington Harbor Coast Guard Station. Interpretation of the results and conclusions are presented.		

## PREFACE

The study described herein was performed at the request of the US Army Engineer District, Detroit, and was authorized on 5 April 1983.

The study was conducted from May 1983 to September 1984. From May 1983 to July 1983, the study was performed at the US Army Engineer Waterways Experiment Station (WES), Hydraulics Laboratory (HL), under the direction of Mr. H. B. Simmons, Chief, Mr. C. E. Chatham, Acting Chief, Wave Dynamics Division (WDD), and Mr. D. G. Outlaw, Acting Chief, Wave Processes Branch. From July 1983 to September 1984, the study was performed at WES in the Coastal Engineering Research Center (CERC), under the direction of Dr. R. W. Whalin, Chief, Dr. Fred Camfield, Acting Chief, Engineering Development Division (EDD), and Dr. Dennis R. Smith, Chief, Prototype Measurement and Analysis Branch. CPT George M. Horsham conducted the study and prepared this report.

Commanders and Directors of WES during the performance of the study and preparation and publication of this report were COL Tilford C. Creel, CE, and COL Robert C. Lee, CE. Technical Director was Mr. Fred R. Brown.

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CONVERSION FACTORS, NON-SI TO SI (METRIC)  
UNITS OF MEASUREMENT

Non-SI units of measurement used in this report can be converted to SI (metric) units as follows:

<u>Multiply</u>	<u>By</u>	<u>To Obtain</u>
feet	0.3048	metres
miles (US statute)	1.609347	kilometres
pounds (mass)	0.4535924	kilograms
slugs (mass) per cubic foot	515.3788	kilograms per cubic metre

WAVE CLIMATOLOGY STUDY FOR LUDINGTON HARBOR, MICHIGAN

PART I: INTRODUCTION

1. At the request of the US Army Engineer District, Detroit, the Coastal Engineering Research Center (CERC) of the US Army Engineer Waterways Experiment Station (WES) submitted a proposal for conducting a wave climatology study of Ludington Harbor, Michigan. The proposal was accepted, and funds for the study were authorized on 5 April 1983.

2. The primary objective of the study was to measure wave conditions in Lake Michigan in the vicinity of the harbor entrance and, simultaneously, in the Ludington Harbor channel. The acquired wave data were then used to characterize the relationship between wave conditions in the inner harbor with those occurring in the lake.

3. Ludington Harbor, Michigan, is located on the eastern shore of Lake Michigan, about 153 miles\* northeast of Chicago, Illinois, and 60 miles north of Muskegon, Michigan (Figure 1). The harbor is configured as an outer basin formed by two shore-connected arrowhead breakwaters and an inner channel which connects the outer basin with the northern end of Pere Marquette Lake where the lake ferry berthing facilities are located (Figure 2).

4. The scope of work of the study included design, deployment, maintenance, and recovery of two wave measurement systems, reduction and analysis of acquired wave data, correlation of observed wind and wave conditions, and evaluation of results.

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\* A table of factors for converting non-SI units of measurement to SI (metric) units is presented on page 3.

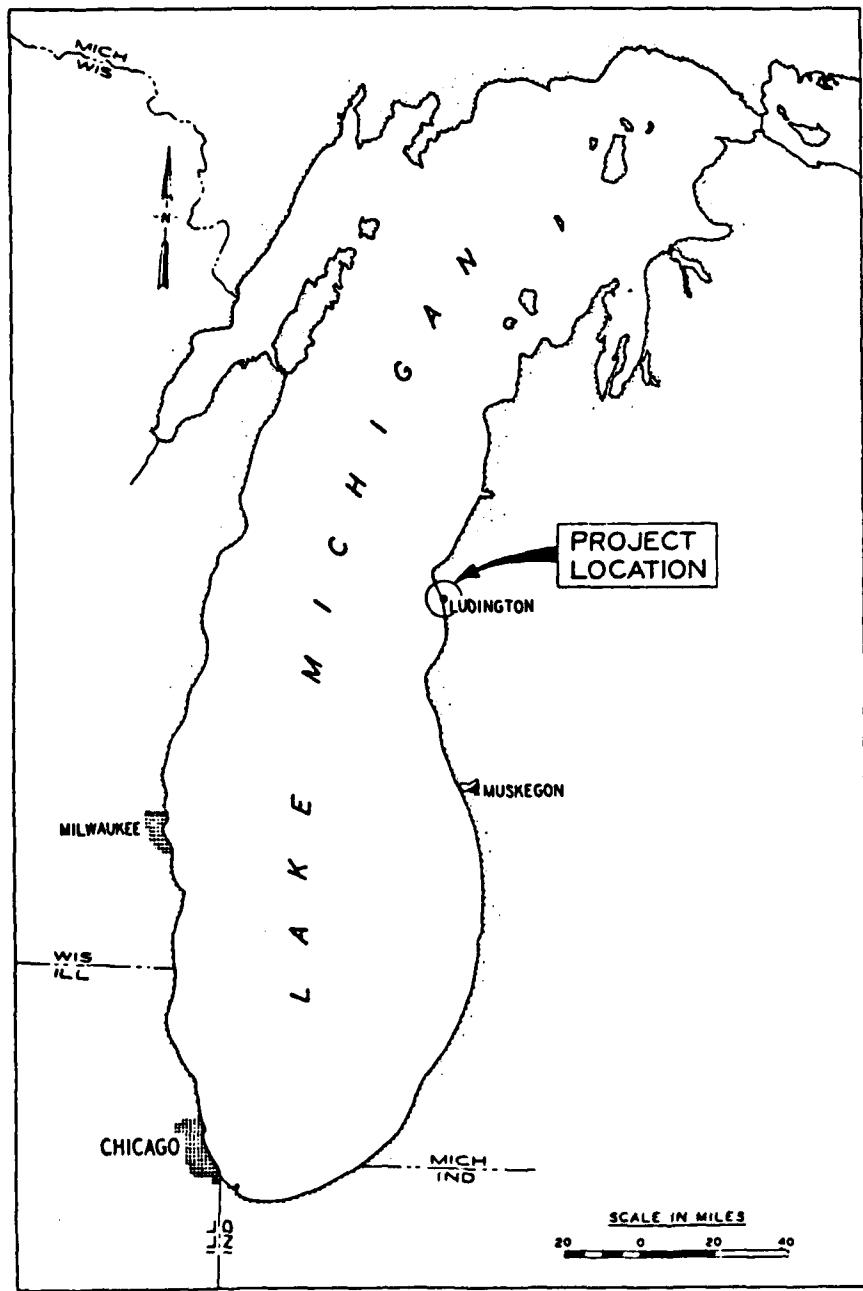


Figure 1. Vicinity map

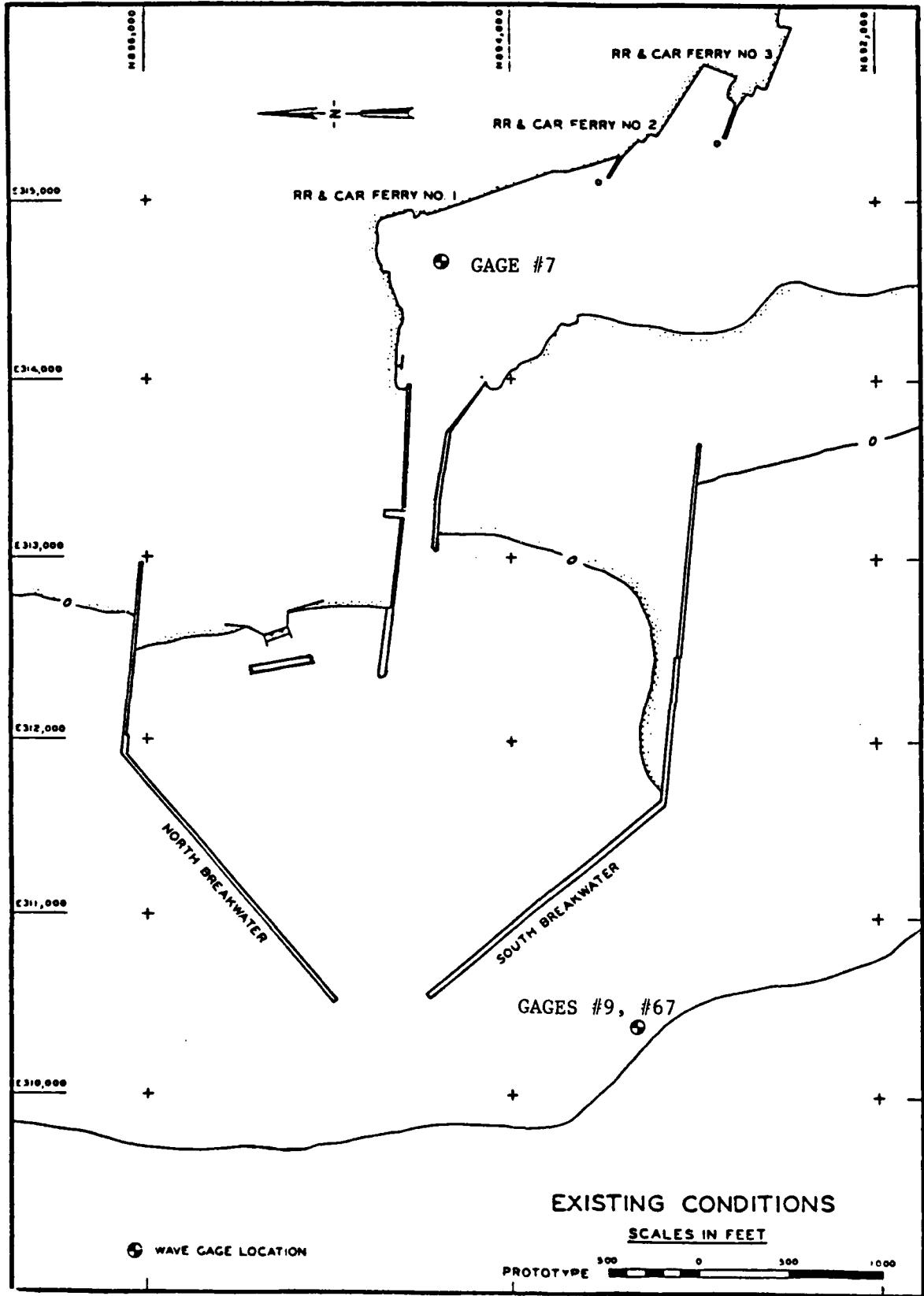


Figure 2. Wave gage locations

## PART II: WAVE MEASUREMENT SYSTEM

5. Each of the two wave measurement systems employed in the study consisted of a tripod instrumentation platform, wave gage, acoustic location device, steel mooring cable and float, and a lighted witness buoy. Figure 3 is a schematic depiction of the system. The wave gages are self-contained, internal recording pressure sensing instruments. The gages were configured to acquire 1,024 pressure samples N at a rate of 1 Hz, resulting in record lengths of 1,024 sec T , or about 17 min. A wave record was acquired every 2 hr.

6. The wave measurement systems were initially deployed on 26 May 1983 with the assistance of Grand Haven Area Office, CE, personnel. Gage 9 was deployed in Lake Michigan; Gage 7 was deployed at the east end of Ludington Harbor Channel. Site selection for placement of the gages was made after reviewing information presented in the physical model study of Ludington Harbor.\* The gages were serviced at approximately 60-day intervals. During the October 1983 servicing, Gage 9 was found to be defective and was replaced by Gage 67. The gages were retrieved from the measurement sites on 10 December 1983.

7. Table 1 provides a wave data statistical analysis summary, and Tables 2-4 provide a wave data record summary for Gages 7 and 9. Significant wave height versus time data for Gages 7, 9, and 67 are presented in Plates 1-6.

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\* L. G. Crosby and C. E. Chatham, Jr. 1975 (Sep). "Design of Entrance Channel Improvements for Ludington Harbor, Michigan; Hydraulic Model Investigation," Technical Report H-75-14, US Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.

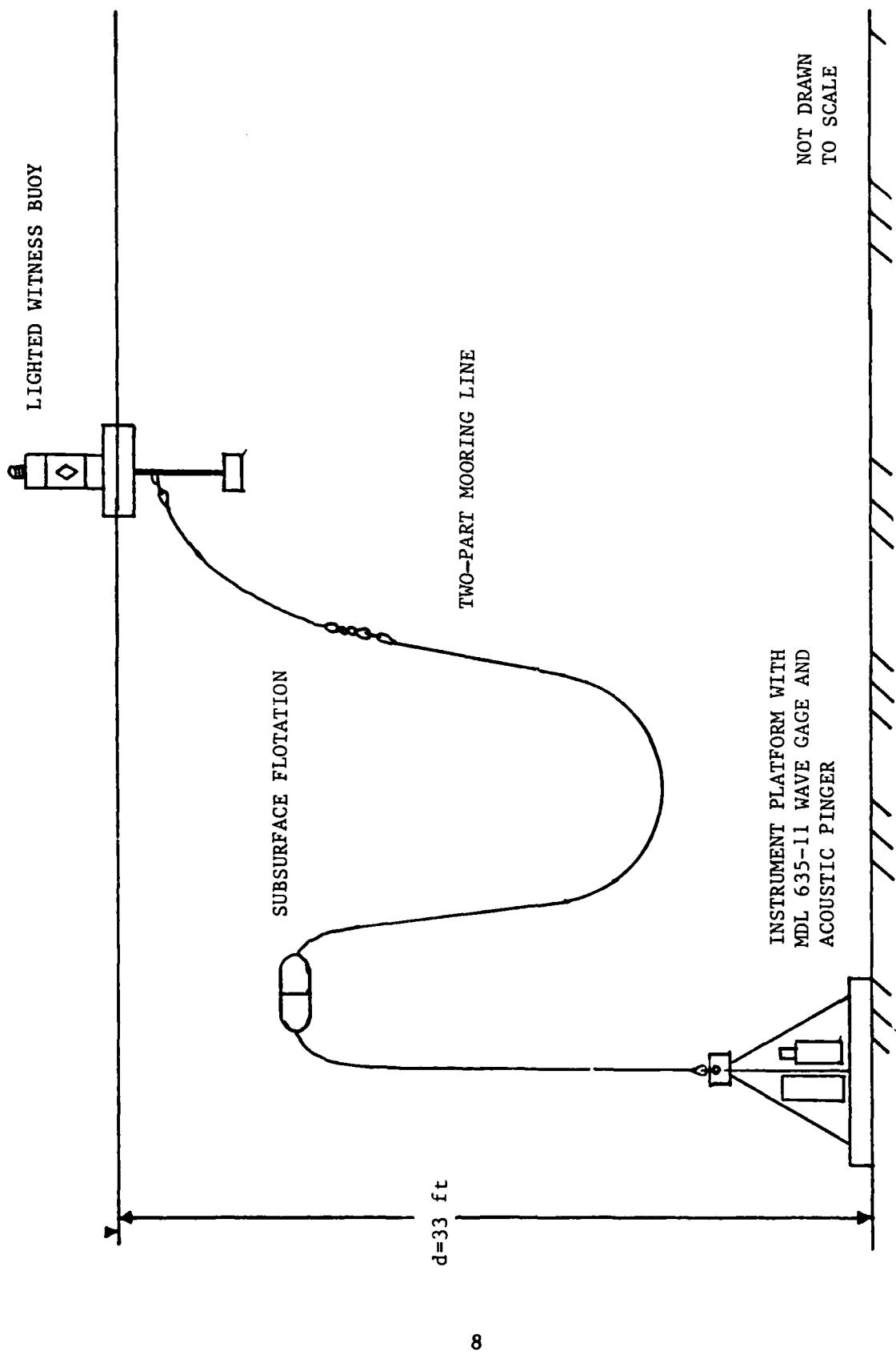


Figure 3. Wave gage measurement system

### PART III: DATA PROCESSING AND ANALYSIS

8. The raw data were examined and edited for bad data points. Those wave records which contained greater than a selected small percentage of bad data points were discarded. The edited wave records then were spectrally analyzed via a Fast Fourier Transform algorithm. The appropriate depth response factor was applied to each frequency band, and pertinent statistics were computed. The computed statistics include significant wave height  $H_s$ , peak period  $T_s$ , and spectral density plots for selected wave records (Appendix B). The spectral plot scaling factor is constant to allow direct intercomparison of results. The plots are useful for intercomparison of wave conditions in the lake and channel at corresponding times. Appendix A provides details of the wave data processing procedure.

9. Wind direction, wind speed, and significant wave height measured at both locations were correlated as functions of time during periods of significant wave activity. The correlation procedure consisted of plotting wind-speed, wind direction, and significant wave heights as ordinate values and times as the abscissa (Appendix B).

Table 2 (Continued)

RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)	RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)
161	172	16.00	0	227.554	0.088	362	174	650	0	227.554	0.223
361	172	17.00	0	227.556	0.065	363	174	850	0	227.556	0.193
362	172	18.00	0	227.556	0.061	364	174	1030	0	227.556	0.236
363	172	20.00	0	227.556	0.079	365	174	1230	0	227.556	0.366
364	172	21.00	0	227.556	0.066	366	174	1430	0	227.556	0.321
365	172	22.00	0	227.556	0.111	367	174	1630	0	227.556	0.188
366	172	23.00	0	227.556	0.166	368	174	1830	0	227.556	0.196
367	172	4.00	0	227.556	0.082	369	174	2030	0	227.556	0.222
368	172	5.00	0	227.556	0.059	370	174	2230	0	227.556	0.150
369	172	6.00	0	227.556	0.178	371	174	2430	0	227.556	0.165
370	172	7.00	0	227.556	0.150	372	175	30	0	227.556	0.121
371	172	8.00	0	227.556	0.152	373	175	230	0	227.556	0.067
372	172	9.00	0	227.556	0.156	374	175	430	0	227.556	0.067
373	172	10.00	0	227.556	0.147	375	175	630	0	227.556	0.051
374	172	11.00	0	227.556	0.049	376	175	830	0	227.556	0.099
375	172	12.00	0	227.556	0.266	377	175	1030	0	227.556	0.192
376	172	13.00	0	227.556	0.220	378	175	1230	0	227.556	0.159
377	172	14.00	0	227.556	0.168	379	175	1430	0	227.556	0.349
378	172	15.00	0	227.556	0.150	380	175	1630	0	227.556	0.351
379	172	16.00	0	227.556	0.135	381	175	1830	0	227.556	0.072
380	172	17.00	0	227.556	0.082	382	175	2030	0	227.556	0.382
381	172	18.00	0	227.556	0.113	383	175	2230	0	227.556	0.395
382	172	19.00	0	227.556	0.200	384	175	2430	0	227.556	0.203
383	172	20.00	0	227.556	0.176	385	176	30	0	227.556	0.236
384	172	21.00	0	227.556	0.057	386	176	230	0	227.556	0.224
385	172	22.00	0	227.556	0.117	387	176	430	0	227.556	0.157
386	172	23.00	0	227.556	0.220	388	176	630	0	227.556	0.157
387	172	24.00	0	227.556	0.168	389	176	830	0	227.556	0.221
388	172	25.00	0	227.556	0.035	390	176	1030	0	227.556	0.199
389	172	26.00	0	227.556	0.156	391	176	1230	0	227.556	0.241
390	172	27.00	0	227.556	0.200	392	176	1430	0	227.556	0.248
391	172	28.00	0	227.556	0.176	393	176	1630	0	227.556	0.258
392	172	29.00	0	227.556	0.080	394	176	1830	0	227.556	0.229
393	172	30.00	0	227.556	0.090	395	176	2030	0	227.556	0.191
394	172	31.00	0	227.556	0.119	396	176	2230	0	227.556	0.191
395	172	32.00	0	227.556	0.116	397	176	2430	0	227.556	0.199
396	172	33.00	0	227.556	0.113	398	176	30	0	227.556	0.199
397	172	34.00	0	227.556	0.111	399	176	230	0	227.556	0.199
398	172	35.00	0	227.556	0.057	400	176	430	0	227.556	0.248
399	172	36.00	0	227.556	0.117	401	176	630	0	227.556	0.258
400	172	37.00	0	227.556	0.220	402	176	830	0	227.556	0.229
401	172	38.00	0	227.556	0.117	403	176	1030	0	227.556	0.229
402	172	39.00	0	227.556	0.067	404	176	1230	0	227.556	0.229
403	172	40.00	0	227.556	0.112	405	176	1430	0	227.556	0.229
404	172	41.00	0	227.556	0.219	406	176	1630	0	227.556	0.229
405	172	42.00	0	227.556	0.154	407	176	1830	0	227.556	0.229
406	172	43.00	0	227.556	0.064	408	176	2030	0	227.556	0.229
407	172	44.00	0	227.556	0.075	409	176	2230	0	227.556	0.229
408	172	45.00	0	227.556	0.109	410	176	2430	0	227.556	0.229
409	172	46.00	0	227.556	0.066	411	176	30	0	227.556	0.229
410	172	47.00	0	227.556	0.122	412	176	230	0	227.556	0.229
411	172	48.00	0	227.556	0.163	413	176	430	0	227.556	0.229
412	172	49.00	0	227.556	0.087	414	176	630	0	227.556	0.229
413	172	50.00	0	227.556	0.153	415	176	830	0	227.556	0.229
414	172	51.00	0	227.556	0.076	416	176	1030	0	227.556	0.229
415	172	52.00	0	227.556	0.117	417	176	1230	0	227.556	0.229
416	172	53.00	0	227.556	0.207	418	176	1430	0	227.556	0.229
417	172	54.00	0	227.556	0.107	419	176	1630	0	227.556	0.229
418	172	55.00	0	227.556	0.145	420	176	1830	0	227.556	0.229
419	172	56.00	0	227.556	0.094	421	176	2030	0	227.556	0.229
420	172	57.00	0	227.556	0.110	422	176	2230	0	227.556	0.229
421	172	58.00	0	227.556	0.064	423	176	2430	0	227.556	0.229
422	172	59.00	0	227.556	0.109	424	176	30	0	227.556	0.229
423	172	60.00	0	227.556	0.066	425	176	230	0	227.556	0.229
424	172	61.00	0	227.556	0.122	426	176	430	0	227.556	0.229
425	172	62.00	0	227.556	0.076	427	176	630	0	227.556	0.229
426	172	63.00	0	227.556	0.163	428	176	830	0	227.556	0.229
427	172	64.00	0	227.556	0.076	429	176	1030	0	227.556	0.229
428	172	65.00	0	227.556	0.134	430	176	1230	0	227.556	0.229
429	172	66.00	0	227.556	0.076	431	176	1430	0	227.556	0.229
430	172	67.00	0	227.556	0.107	432	176	1630	0	227.556	0.229
431	172	68.00	0	227.556	0.052	433	176	1830	0	227.556	0.229
432	172	69.00	0	227.556	0.107	434	176	2030	0	227.556	0.229
433	172	70.00	0	227.556	0.052	435	176	2230	0	227.556	0.229
434	172	71.00	0	227.556	0.145	436	176	2430	0	227.556	0.229
435	172	72.00	0	227.556	0.094	437	176	30	0	227.556	0.229
436	172	73.00	0	227.556	0.110	438	176	230	0	227.556	0.229
437	172	74.00	0	227.556	0.064	439	176	430	0	227.556	0.229
438	172	75.00	0	227.556	0.109	440	176	630	0	227.556	0.229
439	172	76.00	0	227.556	0.066	441	176	830	0	227.556	0.229
440	172	77.00	0	227.556	0.122	442	176	1030	0	227.556	0.229
441	172	78.00	0	227.556	0.076	443	176	1230	0	227.556	0.229
442	172	79.00	0	227.556	0.163	444	176	1430	0	227.556	0.229
443	172	80.00	0	227.556	0.076	445	176	1630	0	227.556	0.229
444	172	81.00	0	227.556	0.107	446	176	1830	0	227.556	0.229
445	172	82.00	0	227.556	0.052	447	176	2030	0	227.556	0.229
446	172	83.00	0	227.556	0.145	448	176	2230	0	227.556	0.229
447	172	84.00	0	227.556	0.094	449	176	2430	0	227.556	0.229
448	172	85.00	0	227.556	0.110	449	176	30	0	227.556	0.229
449	172	86.00	0	227.556	0.064	450	176	230	0	227.556	0.229
450	172	87.00	0	227.556	0.109	451	176	430	0	227.556	0.229
451	172	88.00	0	227.556	0.066	452	176	630	0	227.556	0.229
452	172	89.00	0	227.556	0.122	453	176	830	0	227.556	0.229
453	172	90.00	0	227.556	0.076	454	176	1030	0	227.556	0.229
454	172	91.00	0	227.556	0.163	455	176	1230	0	227.556	0.229
455	172	92.00	0	227.556	0.076	456	176	1430	0	227.556	0.229
456	172	93.00	0	227.556	0.107	457	176	1630	0	227.556	0.229
457	172	94.00	0	227.556	0.052	458	176	1830	0	227.556	0.229

Table 2 (Continued)

RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)	RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)
201	16.0	16:00	0	227.5554	0.049	251	16.9	050	0	227.5556	0.049
202	16.0	18:00	0	227.5554	0.043	252	16.9	100	0	227.5556	0.046
203	16.0	20:00	0	227.5554	0.049	253	16.9	1230	0	227.5556	0.046
204	16.0	22:00	0	227.5554	0.167	254	16.9	1430	0	227.5556	0.161
205	16.0	00:00	0	227.5554	0.027	255	16.9	1630	0	227.5556	0.128
206	16.0	02:00	0	227.5554	0.058	256	16.9	1830	0	227.5556	0.117
207	16.0	04:00	0	227.5554	0.071	257	16.9	1830	0	227.5556	0.193
208	16.0	06:00	0	227.5554	0.071	258	16.9	2030	1	4.819	0.222
209	16.0	08:00	0	227.5554	0.100	259	16.9	2230	0	227.5556	0.164
210	16.0	10:00	0	227.5554	0.071	260	16.9	2338	0	227.5556	0.164
211	16.0	12:00	0	227.5554	0.057	261	17.0	30	0	227.5556	0.128
291	17.0	12:00	1,211	0.046	292	17.0	230	0	227.5556	0.122	
292	17.0	14:00	0	227.5554	0.027	293	17.0	430	0	227.5556	0.090
293	17.0	16:00	0	227.5554	0.059	294	17.0	630	17	227.5556	0.110
294	17.0	18:00	0	227.5554	0.073	295	17.0	830	0	227.5556	0.183
295	17.0	20:00	0	227.5554	0.110	296	17.0	1030	3	227.5556	0.114
296	17.0	22:00	0	227.5554	0.133	297	17.0	1230	0	227.5556	0.113
297	17.0	00:00	0	227.5554	0.212	298	17.0	1430	0	227.5556	0.161
298	17.0	02:00	0	227.5554	0.043	299	17.0	1630	0	227.5556	0.246
299	17.0	04:00	0	227.5554	0.058	300	17.0	1830	0	227.5556	0.183
300	17.0	06:00	0	227.5554	0.254	301	17.0	2030	0	227.5556	0.334
301	17.0	08:00	0	227.5554	0.067	302	17.0	2230	0	227.5556	0.276
302	17.0	10:00	0	227.5554	0.161	303	17.1	30	5,007	227.5556	0.250
303	17.1	12:00	0	227.5554	0.169	304	17.1	230	0	227.5556	0.214
304	17.1	14:00	0	227.5554	0.073	305	17.1	430	0	227.5556	0.210
305	17.1	16:00	0	227.5554	0.069	306	17.1	630	0	227.5556	0.159
306	17.1	18:00	0	227.5554	0.104	307	17.1	830	0	227.5556	0.172
307	17.1	20:00	0	227.5554	0.232	308	17.1	1030	0	227.5556	0.201
308	17.1	22:00	0	227.5554	0.150	309	17.1	1230	0	227.5556	0.183
309	17.2	00:00	0	227.5554	0.114	310	17.1	1430	0	227.5556	0.173
310	17.2	02:00	0	227.5554	0.091	311	17.1	1630	0	227.5556	0.310
311	17.2	04:00	0	227.5554	0.073	312	17.1	1830	0	227.5556	0.210
312	17.2	06:00	0	227.5554	0.069	313	17.1	2030	0	227.5556	0.153
313	17.2	08:00	0	227.5554	0.153	314	17.1	2230	0	227.5556	0.152
314	17.2	10:00	0	227.5554	0.146	315	17.1	2430	0	227.5556	0.161
315	17.2	12:00	0	227.5554	0.123	316	17.2	30	0	227.5556	0.121
316	17.2	14:00	0	227.5554	0.150	317	17.2	171	0	227.5556	0.173
317	17.2	16:00	0	227.5554	0.062	318	17.2	191	0	227.5556	0.066
318	17.2	18:00	0	227.5554	0.062	319	17.2	211	0	227.5556	0.128
319	17.2	20:00	0	227.5554	0.076	320	17.2	2310	0	227.5556	0.495
320	17.2	22:00	0	227.5554	0.155	321	17.2	2510	0	227.5556	0.203
321	17.3	00:00	0	227.5554	0.104	322	17.2	2710	0	227.5556	0.197
322	17.3	02:00	0	227.5554	0.088	323	17.2	2910	0	227.5556	0.189
323	17.3	04:00	0	227.5554	0.123	324	17.2	3110	0	227.5556	0.090
324	17.3	06:00	0	227.5554	0.141	325	17.2	3310	0	227.5556	0.121
325	17.3	08:00	0	227.5554	0.062	326	17.2	3510	0	227.5556	0.066
326	17.3	10:00	0	227.5554	0.156	327	17.2	3710	0	227.5556	0.232
327	17.3	12:00	0	227.5554	0.176	328	17.2	3910	0	227.5556	0.133
328	17.3	14:00	0	227.5554	0.153	329	17.2	4110	0	227.5556	0.124
329	17.3	16:00	0	227.5554	0.088	330	17.2	4310	0	227.5556	0.133
330	17.3	18:00	0	227.5554	0.123	331	17.2	4510	0	227.5556	0.190
331	17.3	20:00	0	227.5554	0.101	332	17.2	4710	0	227.5556	0.190
332	17.3	22:00	0	227.5554	0.190	333	17.2	4910	0	227.5556	0.198
333	17.4	00:00	0	227.5554	0.135	334	17.2	5110	0	227.5556	0.200
334	17.4	02:00	0	227.5554	0.099	335	17.2	5310	0	227.5556	0.153
335	17.4	04:00	0	227.5554	0.124	336	17.2	5510	0	227.5556	0.198
336	17.4	06:00	0	227.5554	0.071	337	17.2	5710	0	227.5556	0.200
337	17.4	08:00	0	227.5554	0.176	338	17.2	5910	0	227.5556	0.153
338	17.4	10:00	0	227.5554	0.087	339	17.2	6110	0	227.5556	0.198
339	17.4	12:00	0	227.5554	0.071						

(Continued)

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Table 2 (Continued)

RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)	RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)
222	164	1930	0	227.556	0.052	222	164	1010	0	227.556	0.204
223	164	2130	0	227.556	0.056	223	164	1230	0	227.556	0.147
224	164	2230	0	227.556	0.061	224	164	1430	4, 055	227.556	0.214
225	165	0	227.556	0.061	225	164	1630	0	227.556	0.154	
226	165	2330	0	227.556	0.066	226	164	1830	3, 703	227.556	0.159
227	165	2350	0	227.556	0.072	227	164	2030	227.556	0.09	
228	165	2350	0	227.556	0.074	228	164	2230	227.556	0.116	
229	165	2350	0	227.556	0.061	229	165	2350	227.556	0.127	
230	165	1030	0	227.556	0.067	230	165	1230	227.556	0.132	
231	165	1230	0	227.556	0.051	231	165	1430	227.556	0.175	
232	165	1430	0	227.556	0.116	232	165	1630	227.556	0.128	
233	165	1630	0	227.556	0.073	233	165	1830	227.556	0.18	
234	165	1830	0	227.556	0.096	234	165	2030	227.556	0.115	
235	165	2030	0	227.556	0.060	235	165	2230	227.556	0.104	
236	165	2230	0	227.556	0.146	236	165	2350	227.556	0.317	
237	166	30	0	227.556	0.119	237	165	1230	227.556	0.518	
238	166	277	0	227.556	0.264	238	165	1430	227.556	0.766	
239	166	450	0	227.556	0.122	239	165	1630	227.556	0.055	
240	166	630	0	227.556	0.116	240	165	1830	227.556	0.568	
241	166	830	0	227.556	0.196	241	165	2030	227.556	0.931	
242	166	1030	0	227.556	0.188	242	165	2230	227.556	0.820	
243	166	1230	0	227.556	0.095	243	166	2350	227.556	0.864	
244	166	1430	0	227.556	0.198	244	166	1630	227.556	0.743	
245	166	1630	0	227.556	0.100	245	166	1830	227.556	0.612	
246	166	1830	0	227.556	0.090	246	166	2030	227.556	0.572	
247	166	2030	0	227.556	0.185	247	166	2230	227.556	0.694	
248	166	2230	0	227.556	0.262	248	166	2350	227.556	0.770	
249	167	10	0	227.556	0.118	249	166	1230	227.556	0.674	
250	167	210	0	227.556	0.254	250	166	1430	227.556	0.497	
251	167	410	0	227.556	0.198	251	166	1630	227.556	0.319	
252	167	610	0	227.556	0.100	252	166	1830	227.556	0.400	
253	167	810	0	227.556	0.161	253	166	2030	227.556	0.814	
254	167	1010	0	227.556	0.128	254	166	2230	227.556	1.056	
255	167	1210	0	227.556	0.135	255	166	2350	227.556	0.619	
256	167	1430	0	227.556	0.017	256	167	1630	227.556	0.368	
257	167	1630	0	227.556	0.044	257	167	1830	227.556	0.965	
258	167	1830	0	227.556	0.081	258	167	2030	227.556	1.103	
259	167	2030	0	227.556	0.093	259	167	2230	227.556	0.055	
260	167	2230	0	227.556	0.163	260	167	2350	227.556	0.432	
261	168	30	0	227.556	0.045	261	167	1230	227.556	0.551	
262	168	1630	0	227.556	0.02	262	167	1430	227.556	0.659	
263	168	2350	0	227.556	0.126	263	167	1630	227.556	0.248	
264	168	2350	0	227.556	0.102	264	167	1830	227.556	0.351	
265	168	2350	0	227.556	0.044	265	167	2030	227.556	0.189	
266	168	2350	0	227.556	0.054	266	167	2230	227.556	0.002	
267	168	1030	0	227.556	0.099	267	168	1230	227.556	0.078	
268	168	1230	0	227.556	0.080	268	168	1430	227.556	0.081	
269	168	1430	0	227.556	0.064	269	168	1630	227.556	0.089	
270	168	1630	0	227.556	0.043	270	168	1830	227.556	0.005	
271	168	2030	0	227.556	0.02	271	168	2030	227.556	0.007	
272	168	2230	0	227.556	0.182	272	168	2230	227.556	0.125	
273	168	1030	0	227.556	0.059	273	168	1230	227.556	0.094	
274	168	1230	0	227.556	0.159	274	168	1430	227.556	0.102	
275	168	1430	0	227.556	0.123	275	168	1630	227.556	0.081	
276	168	1630	0	227.556	0.160	276	168	1830	227.556	0.007	
277	168	1830	0	227.556	0.126	277	168	2030	227.556	0.162	
278	168	2030	0	227.556	0.113	278	168	2230	227.556	0.125	
279	168	2230	0	227.556	0.12	279	168	2350	227.556	0.086	
280	168	1230	0	227.556	0.048	280	168	1430	227.556	0.112	
											0.146

(Continued)

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Table 2 (Continued)

RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)	RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)
163	159	2110	0	2111 556	0.146	163	159	1220	0	227.556	0.117
164	159	2210	0	227.556	0.102	164	159	1430	0	227.556	0.137
165	160	0	0	227.556	0.154	155	159	1630	0	227.556	0.120
166	160	2110	0	227.556	0.176	155	159	1730	0	227.556	0.107
167	161	0	0	227.556	0.177	156	159	1830	0	227.556	0.143
168	161	610	0	227.556	0.107	157	159	2030	0	227.556	0.143
169	161	610	0	227.556	0.177	158	159	2230	0	227.556	0.176
170	161	850	0	227.556	0.193	159	159	2230	0	227.556	0.176
171	160	1030	0	227.556	0.122	159	160	230	0	227.556	0.203
172	160	1230	0	227.556	0.153	160	160	230	0	227.556	0.203
173	160	1410	0	4.819	1.157	171	160	430	0	227.556	0.289
174	160	1610	0	4.810	0.121	172	160	630	0	4.481	0.450
175	160	1810	0	227.556	0.174	173	160	830	0	4.188	1.597
176	160	2010	0	227.556	0.192	174	160	1030	0	4.055	1.022
177	160	2230	0	227.556	0.098	175	160	1230	0	227.556	2.204
178	161	310	1	227.556	0.042	176	160	1430	0	4.330	2.040
179	161	230	0	227.556	0.077	177	160	1630	0	4.644	1.826
180	161	410	0	227.556	0.092	178	160	1830	0	5.931	1.028
181	161	610	0	227.556	0.059	179	160	2030	0	5.007	0.071
182	161	850	0	227.556	0.094	180	160	2230	0	6.819	0.812
183	161	1030	0	227.556	0.144	181	161	330	0	4.330	0.666
184	161	1230	0	227.556	0.181	182	161	230	0	4.055	0.971
185	161	1430	0	227.556	0.192	183	161	430	0	5.931	0.442
186	161	1630	0	227.556	0.111	184	161	630	0	4.188	0.400
187	161	1810	0	227.556	0.091	185	161	830	0	4.330	0.559
188	161	2230	0	227.556	0.141	186	161	1030	0	227.556	0.441
189	162	30	0	227.556	0.079	187	161	1230	0	227.556	0.327
190	162	230	0	227.556	0.076	188	161	1430	0	227.556	0.175
191	162	410	0	227.556	0.075	189	161	1630	0	3.703	0.127
192	162	610	0	227.556	0.050	190	161	1830	0	227.556	0.202
193	162	850	0	227.556	0.061	191	161	2030	0	5.007	0.300
194	162	1030	0	227.556	0.126	192	161	2230	0	227.556	0.204
195	162	1230	0	227.556	0.149	193	162	30	0	227.556	0.214
196	162	1430	1	227.556	0.049	194	162	230	0	227.556	0.201
197	162	1630	0	227.556	0.034	195	162	430	0	227.556	0.194
198	162	1810	0	227.556	0.075	196	162	630	0	227.556	0.194
199	162	2010	0	227.556	0.050	197	162	830	0	4.819	0.180
200	162	2230	0	227.556	0.061	198	162	1030	0	227.556	0.116
201	163	30	0	227.556	0.037	199	162	1230	0	4.188	0.166
202	163	230	0	227.556	0.100	200	162	1430	0	227.556	0.168
203	163	410	0	227.556	0.053	201	162	1630	0	227.556	0.237
204	163	610	0	227.556	0.065	202	162	1830	0	227.556	0.109
205	163	850	0	227.556	0.098	203	162	2030	0	227.556	0.240
206	163	1030	0	227.556	0.110	204	162	2230	0	227.556	0.141
207	163	1230	0	227.556	0.058	205	163	30	0	227.556	0.115
208	163	1430	0	4.055	0.075	206	163	230	0	227.556	0.111
209	163	1610	1	227.556	0.051	207	163	430	0	227.556	0.083
210	163	1810	0	227.556	0.109	208	163	630	0	227.556	0.101
211	163	2010	0	227.556	0.116	209	163	830	0	227.556	0.143
212	163	2230	0	227.556	0.056	210	163	1030	0	227.556	0.119
213	164	30	0	227.556	0.060	211	163	1230	0	227.556	0.131
214	164	230	0	227.556	0.078	212	163	1430	0	3.599	0.186
215	164	430	0	227.556	0.058	213	163	1630	0	3.703	0.209
216	164	630	0	227.556	0.053	214	163	1830	0	227.556	0.193
217	164	830	0	227.556	0.100	215	163	2030	0	3.703	0.141
218	164	1030	0	227.556	0.077	216	163	2230	0	227.556	0.127
219	164	1230	0	227.556	0.127	217	164	30	0	227.556	0.156
220	164	1430	0	227.556	0.112	218	164	230	0	227.556	0.100
221	164	1630	0	227.556	0.037	219	164	430	0	227.556	0.130
				0.061		220	164	630	0	227.556	0.117
						221	164	830	0	227.556	0.185

(Continued)

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Table 2 (Continued)

RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)	RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)
104	154	2230	0	227.556	0.186	124	154	1430	0	227.556	0.212
105	155	30	0	227.556	0.148	125	154	1630	0	227.556	0.082
106	155	230	0	227.556	0.082	126	154	1830	0	227.556	0.087
107	155	430	0	227.556	0.024	127	154	2030	0	227.556	0.283
108	155	630	0	227.556	0.156	128	154	2230	1	4.819	0.112
109	155	830	0	227.556	0.193	129	155	230	0	227.556	0.110
110	155	1030	0	227.556	0.154	130	155	230	0	227.556	0.092
111	155	1230	0	227.556	0.070	111	155	430	0	227.556	0.119
112	155	1430	0	227.556	0.069	112	155	630	0	227.556	0.153
113	155	1630	0	227.556	0.079	113	155	830	0	227.556	0.212
114	155	1830	0	227.556	0.124	114	155	1030	0	227.556	0.164
115	155	2030	0	227.556	0.157	115	155	1230	0	227.556	0.105
116	155	2230	0	227.556	0.131	116	155	1430	0	227.556	0.181
117	156	30	0	227.556	0.123	117	155	1630	0	227.556	0.175
118	156	230	0	227.556	0.099	118	155	1830	0	227.556	0.153
119	156	430	0	227.556	0.112	119	155	2030	0	227.556	0.340
120	156	630	0	227.556	0.177	120	155	2230	0	227.556	0.364
121	156	830	0	227.556	0.048	121	155	230	0	227.556	0.215
122	156	1030	0	227.556	0.108	122	156	230	0	227.556	0.114
123	156	1230	0	227.556	0.079	123	156	430	0	227.556	0.198
124	156	1430	0	227.556	0.126	124	156	630	0	227.556	0.396
125	156	1630	0	227.556	0.090	125	156	830	0	227.556	0.241
126	156	1830	0	227.556	0.124	126	156	1030	0	227.556	0.357
127	156	2030	0	227.556	0.111	127	156	1230	0	227.556	0.188
128	156	2230	0	227.556	0.089	128	156	1430	0	227.556	0.266
129	157	30	0	227.556	0.334	129	156	1630	0	227.556	0.339
130	157	230	0	227.556	0.083	130	156	1830	0	227.556	0.160
131	157	430	0	227.556	0.084	131	156	2030	0	227.556	0.123
132	157	630	0	227.556	0.090	132	156	2230	0	227.556	0.221
133	157	830	0	227.556	0.124	133	156	1030	0	227.556	0.155
134	157	1030	0	227.556	0.111	134	156	1230	0	227.556	0.170
135	157	1230	0	227.556	0.179	135	156	1430	0	227.556	0.204
136	157	1430	0	227.556	0.100	136	156	1630	0	227.556	0.240
137	157	1630	0	227.556	0.071	137	156	1830	0	227.556	0.308
138	157	1830	0	227.556	0.105	138	157	2030	0	227.556	0.102
139	157	2030	0	227.556	0.087	139	157	2230	0	227.556	0.105
140	157	2230	0	227.556	0.031	140	157	1030	0	227.556	0.174
141	158	30	0	227.556	0.356	141	157	1230	0	227.556	0.068
142	158	230	0	227.556	0.159	142	157	1430	0	227.556	0.134
143	158	430	0	227.556	0.004	143	157	1630	0	227.556	0.123
144	158	630	0	227.556	0.164	144	157	1830	0	227.556	0.224
145	158	830	0	227.556	0.277	145	157	2030	0	227.556	0.174
146	158	1030	0	227.556	0.105	146	157	2230	0	227.556	1.008
147	158	1230	0	227.556	0.031	147	157	1030	0	227.556	0.174
148	158	1430	0	227.556	0.183	148	157	1230	0	227.556	0.260
149	158	1630	0	227.556	0.075	149	157	1430	0	227.556	0.261
150	158	1830	0	227.556	0.072	150	157	1630	0	227.556	0.268
151	158	2030	0	227.556	0.164	151	157	1830	0	227.556	0.256
152	158	2230	0	227.556	0.057	152	157	2030	0	227.556	0.274
153	158	30	0	227.556	0.148	153	157	1230	0	227.556	0.667
154	158	230	0	227.556	0.119	154	157	1430	0	227.556	0.690
155	158	430	0	227.556	0.015	155	157	1630	0	227.556	0.481
156	158	630	0	227.556	0.030	156	157	1830	0	227.556	0.312
157	158	830	0	227.556	0.074	157	157	2030	0	227.556	0.268
158	158	1030	0	227.556	0.040	158	157	1830	0	227.556	0.159
159	158	1230	0	227.556	0.057	159	157	2030	0	227.556	0.122
160	158	1430	0	227.556	0.061	160	157	1230	0	227.556	0.168
161	158	1630	0	227.556	0.015	161	157	1430	0	227.556	0.166
162	158	1830	0	227.556	0.063	162	157	1630	0	227.556	0.145

(Continued)

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Table 2 (Continued)

RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. MT. (FT.)	RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. MT. (FT.)
43	150	10	0	227.550	0.095	45	149	1630	0	3.703	0.484
44	150	230	0	227.550	0.088	46	149	1830	0	227.550	0.469
47	150	430	0	227.550	0.096	47	149	2030	0	227.550	0.418
48	150	630	0	227.550	0.148	48	149	2230	0	227.550	0.055
49	150	830	0	227.550	0.273	49	150	30	0	227.550	0.391
50	150	1030	0	227.550	0.129	50	150	230	0	227.550	0.204
51	150	1230	0	227.550	0.091	51	150	430	0	227.550	0.345
52	150	1430	0	227.550	0.116	52	150	630	0	227.550	0.252
53	150	1630	0	227.550	0.073	53	150	830	0	227.550	0.308
54	150	1830	0	227.550	0.059	54	150	1030	0	227.550	0.294
55	150	2030	19	4.055	0.278	55	150	1230	0	3.703	0.180
56	150	2230	0	227.550	0.112	56	150	1430	0	3.814	0.254
57	151	10	0	227.550	0.029	57	150	1630	0	227.550	0.253
58	151	230	0	227.550	0.061	58	150	1830	0	3.814	0.147
59	151	430	0	227.550	0.050	59	150	2030	0	227.550	0.150
60	151	630	0	227.550	0.266	60	150	2230	0	4.188	0.300
61	151	830	0	227.550	0.032	61	151	30	0	227.550	0.356
62	151	1030	0	227.550	0.045	62	151	230	0	3.814	0.322
63	151	1230	0	227.550	0.052	63	151	430	0	3.814	0.280
64	151	1430	0	227.550	0.214	64	151	630	0	4.188	0.178
65	151	1630	0	227.550	0.077	65	151	830	0	4.055	0.489
66	151	1830	0	227.550	0.052	66	151	1030	0	3.703	0.364
67	151	2030	0	227.550	0.034	67	151	1230	0	3.814	0.185
68	151	2230	0	227.550	0.101	68	151	1430	0	3.814	0.145
69	152	10	0	227.550	0.037	69	151	1630	0	3.703	0.123
70	152	230	0	227.550	0.069	70	151	1830	0	227.550	0.115
71	152	430	0	227.550	0.070	71	151	2030	0	227.550	0.074
72	152	630	0	227.550	0.071	72	151	2230	0	4.188	0.096
73	152	830	0	227.550	0.115	73	152	30	0	227.550	0.125
74	152	1030	0	227.550	0.146	74	152	230	0	227.550	0.102
75	152	1230	0	227.550	0.075	75	152	430	0	0.138	0.138
76	152	1430	0	227.550	0.115	76	152	630	0	3.814	0.144
77	152	1630	0	227.550	0.113	77	152	830	0	227.550	0.237
78	152	1830	0	227.550	0.052	78	152	1030	0	227.550	0.115
79	152	2030	0	227.550	0.115	79	152	1230	0	227.550	0.157
80	152	2230	0	227.550	0.092	80	152	1430	0	227.550	0.190
81	153	30	0	227.550	0.019	81	152	1630	0	227.550	0.163
82	153	230	0	227.550	0.019	82	152	1830	0	227.550	0.055
83	153	430	0	227.550	0.019	83	152	2030	0	227.550	0.163
84	153	630	0	227.550	0.090	84	152	2230	0	4.188	0.461
85	153	830	0	227.550	0.053	85	152	30	0	227.550	0.098
86	153	1030	0	227.550	0.011	86	152	230	0	227.550	0.199
87	153	1230	0	227.550	0.006	87	152	430	0	227.550	0.061
88	153	1430	0	227.550	0.037	88	152	630	0	227.550	0.107
89	153	1630	0	227.550	0.079	89	152	830	0	3.814	0.112
90	153	1830	0	227.550	0.143	90	152	1030	0	4.188	0.383
91	153	2030	0	227.550	0.118	91	152	1230	0	4.188	0.154
92	153	2230	0	227.550	0.093	92	152	1430	0	227.550	0.138
93	154	10	0	227.550	0.001	93	152	1630	0	227.550	0.120
94	154	230	0	227.550	0.002	94	152	1830	0	227.550	0.061
95	154	430	0	227.550	0.031	95	152	2030	0	227.550	0.225
96	154	630	0	227.550	0.050	96	152	2230	0	4.188	0.225
97	154	830	0	227.550	0.126	97	152	30	0	3.814	0.149
98	154	1030	0	227.550	0.133	98	152	230	0	227.550	0.088
99	154	1230	0	227.550	0.117	99	152	430	0	227.550	0.088
100	154	1430	0	227.550	0.093	100	152	630	0	227.550	0.088
101	154	1630	0	227.550	0.116	101	152	830	0	227.550	0.127
102	154	1830	0	227.550	0.061	102	152	1030	0	4.188	0.220
103	154	2030	0	227.550	0.107	103	152	1230	0	227.550	0.222

(Continued)

(Sheet 2 of 13)

Table 2

Wave Data Record SummaryLudington Harbor, Michigan

a. **Gage 7; Ludington Harbor Channel**  
**26 May 1983 - 25 July 1983**  
**Data Recovery Rate: 98.6%**

b. **Gage 9; Lake Michigan Site**  
**26 May 1983 - 27 July 1983**  
**Data Recovery Rate: 82.7%**

RECORD NUMBER	JULIAN DATE	TIME	WAD POINTS	SIG. PER. (SEC.)	SIG. HF. (FT.)	RECORD NUMBER	JULIAN DATE	TIME	WAD POINTS	SIG. PER. (SEC.)	SIG. HF. (FT.)
1	165	010	0	0.	0.	1	146	20	0	0.	0.
2	166	1250	1	0.	0.	2	146	210	0	0.	0.
3	166	1430	0	227,5556	0.060	3	146	430	1	0.	0.
4	166	1630	0	227,5556	0.020	4	146	630	0	0.	0.
5	166	1830	16	227,5556	0.028	5	146	830	12	0.	0.
6	166	2030	0	227,5556	0.068	6	146	1030	0	0.	0.
7	166	2230	0	227,5556	0.068	7	146	1230	0	3,703	0.568
8	166	2430	0	227,5556	0.135	8	146	1430	0	4,055	0.568
9	167	010	0	227,5556	0.045	9	146	1630	0	5,914	0.340
10	167	410	0	227,5556	0.036	10	146	1830	168	0.	0.
11	167	630	913	0	0.	11	146	2030	882	0.	0.
12	167	830	128	0	0.	12	146	2230	0	227,556	0.234
13	167	1030	0	227,5556	0.074	13	147	30	0	4,819	0.285
14	167	1230	0	227,5556	0.083	14	147	50	0	227,556	0.251
15	167	1430	0	227,5556	0.093	15	147	70	0	0.	0.
16	167	1630	0	227,5556	0.148	16	147	90	0	227,556	0.167
17	167	1830	1	227,5556	0.058	17	147	110	0	227,556	0.261
18	167	2030	0	227,5556	0.126	18	147	130	0	227,556	0.221
19	167	2230	0	227,5556	0.126	19	147	150	0	4,819	0.179
20	167	2430	0	227,5556	0.107	20	147	170	0	227,556	0.250
21	168	010	0	227,5556	0.096	21	147	190	0	3,703	0.322
22	168	210	0	227,5556	0.068	22	147	210	0	0.	0.
23	168	430	0	227,5556	0.068	23	147	230	0	227,556	0.146
24	168	650	0	227,5556	0.053	24	147	250	0	227,556	0.447
25	168	850	0	227,5556	0.059	25	147	270	0	227,556	0.261
26	168	1050	0	227,5556	0.070	26	148	290	0	227,556	0.243
27	168	1250	0	227,5556	0.052	27	148	310	0	227,556	0.243
28	168	1450	0	227,5556	0.210	28	148	330	0	3,703	0.333
29	168	1650	0	227,5556	0.162	29	148	350	0	227,556	0.250
30	168	1850	0	227,5556	0.055	30	148	370	0	227,556	0.322
31	168	2050	0	227,5556	0.049	31	148	390	0	227,556	0.285
32	168	2250	0	227,5556	0.049	32	148	410	0	227,556	0.273
33	168	2450	30	227,5556	0.186	33	148	430	0	227,556	0.133
34	169	010	0	227,5556	0.081	34	148	450	0	227,556	0.243
35	169	230	0	227,5556	0.052	35	148	470	0	227,556	0.133
36	169	430	0	227,5556	0.132	36	148	490	0	227,556	0.139
37	169	630	0	227,5556	0.119	37	148	50	0	6,819	0.400
38	169	830	0	227,5556	0.055	38	148	50	0	227,556	0.285
39	169	1030	0	227,5556	0.049	39	148	50	0	227,556	0.110
40	169	1230	0	227,5556	0.051	40	148	50	0	227,556	0.109
41	169	1430	0	227,5556	0.191	41	148	50	0	227,556	0.193
42	169	1630	0	227,5556	0.199	42	148	50	0	5,814	0.290
43	169	1830	0	227,5556	0.205	43	148	50	0	227,556	0.285
44	169	2030	0	227,5556	0.134	44	148	50	0	4,055	0.337
45	169	2230	0	227,5556	0.284	45	148	50	0	3,814	0.807
46	169	2430	0	227,5556	0.793	46	148	50	0	3,814	0.899

(Continued)

(Sheet 1 of 13)

Table 1 (Concluded)

WAVE NUMBER (#)	WAVE FREQUENCY (HZ.)	PERIOD (SEC.)	VALID OBSERVATIONS (#)	PERCENT VALID RECORDS (%)	AVERAGE SIGNIFICANT HEIGHT (FT.)	STANDARD DEVIATION (FT.)	MAXIMUM DESERVED SIGNIFICANT HEIGHT (FT.)	PROBABLE MAXIMUM WAVE HEIGHT (FT.)
1	0.006	227.556	195.0	28.6	0.5287	0.3888	2.3186	4.3358
2	0.012	81.920	1.0	0.1	1.2804	0.	1.2804	2.3944
3	0.020	49.951	0.	0.	0.	0.	0.	0.
4	0.028	35.930	0.	0.	0.	0.	0.	0.
5	0.036	28.055	0.	0.	0.	0.	0.	0.
6	0.043	23.011	0.	0.	0.	0.	0.	0.
7	0.051	19.505	0.	0.	0.	0.	0.	0.
8	0.059	16.926	0.	0.	0.	0.	0.	0.
9	0.067	14.949	0.	0.	0.	0.	0.	0.
10	0.075	13.586	0.	0.	0.	0.	0.	0.
11	0.083	12.118	0.	0.	0.	0.	0.	0.
12	0.090	11.070	0.	0.	0.	0.	0.	0.
13	0.098	10.189	0.	0.	0.	0.	0.	0.
14	0.106	9.438	0.	0.	0.	0.	0.	0.
15	0.114	8.790	11.0	10.6	2.2104	1.0863	5.2519	9.8211
16	0.122	8.225	25.0	35.7	2.7893	1.8491	8.1939	15.3225
17	0.129	7.728	18.0	20.6	2.9279	2.4602	7.9908	14.9428
18	0.137	7.288	23.0	31.4	3.5539	2.5586	8.7797	16.4180
19	0.145	6.896	25.0	31.7	2.4016	2.4973	7.6918	14.3836
20	0.153	6.543	26.0	35.8	2.8687	2.1552	8.2707	15.4662
21	0.161	6.225	26.0	35.8	2.2917	2.2474	7.7402	14.4741
22	0.168	5.936	28.0	44.1	2.9359	1.4306	5.8857	11.0063
23	0.176	5.673	27.0	44.0	2.2010	1.6535	8.0606	15.0733
24	0.184	5.432	29.0	44.1	2.3200	1.2242	4.6677	8.7286
25	0.192	5.211	19.0	24.8	2.3213	1.0333	4.1625	7.7838
26	0.201	5.007	21.0	35.1	1.4950	0.7449	3.1642	5.9171
27	0.209	4.819	25.0	35.7	1.3369	0.6399	2.6366	4.9305
28	0.215	4.644	16.0	23.3	1.0905	0.7976	3.4809	6.5092
29	0.223	4.481	20.0	24.9	0.9302	0.5756	2.4937	4.6631
30	0.231	4.330	12.0	15.8	0.9301	0.6271	2.4577	4.5958
31	0.239	4.188	19.0	20.8	1.1781	0.7769	2.8329	5.2975
32	0.247	4.055	20.0	24.9	0.8130	0.6439	2.6051	4.8716
33	0.254	3.931	29.0	44.2	0.8066	0.6431	2.1687	4.0554
34	0.262	3.814	32.0	44.7	0.7473	0.7968	4.6968	8.7830
35	0.270	3.703	37.0	54.4	0.8134	0.8811	6.5734	8.5523
36	0.278	3.599	0.	0.	0.	0.	0.	0.
37	0.286	3.501	0.	0.	0.	0.	0.	0.
38	0.293	3.408	0.	0.	0.	0.	0.	0.
39	0.301	3.319	0.	0.	0.	0.	0.	0.
40	0.309	3.235	0.	0.	0.	0.	0.	0.
41	0.317	3.156	0.	0.	0.	0.	0.	0.
42	0.325	3.080	0.	0.	0.	0.	0.	0.
43	0.334	3.007	0.	0.	0.	0.	0.	0.
44	0.343	2.938	0.	0.	0.	0.	0.	0.
45	0.351	2.872	0.	0.	0.	0.	0.	0.
46	0.359	2.817	0.	0.	0.	0.	0.	0.

(Sheet 6 of 6)

Table 1 (Continued)

BAND NUMBER (n)	WAVE FREQUENCY (Hz.)	WAVE PERIOD (SEC.)	VALID OBSERVATIONS (#)	PERCENT OF VALID RECORDS (%)	AVERAGE SIGNIFICANT HEIGHT (ft.)	STANDARD DEVIATION (ft.)	MAXIMUM OBSERVED SIGNIFICANT HEIGHT (ft.)	PROBABLE MAXIMUM WAVE HEIGHT (ft.)
1	0.104	227.556	521.0	72.6	0.1606	0.1163	0.9795	1.0317
2	0.012	81.920	0.	0.	0.	0.	0.	0.
3	0.020	49.951	0.	0.	0.	0.	0.	0.
4	0.028	35.930	0.	0.	0.	0.	0.	0.
5	0.036	29.055	0.	0.	0.	0.	0.	0.
6	0.043	23.011	0.	0.	0.	0.	0.	0.
7	0.051	19.505	0.	0.	0.	0.	0.	0.
8	0.059	16.926	0.	0.	0.	0.	0.	0.
9	0.067	14.949	0.	0.	0.	0.	0.	0.
10	0.075	13.386	0.	0.	0.	0.	0.	0.
11	0.083	12.118	0.	0.	0.	0.	0.	0.
12	0.090	11.076	0.	0.	0.	0.	0.	0.
13	0.098	10.189	0.	0.	0.	0.	0.	0.
14	0.106	9.435	0.	0.	0.	0.	0.	0.
15	0.114	8.790	0.	0.	0.	0.	0.	0.
16	0.122	8.225	0.	0.	0.	0.	0.	0.
17	0.129	7.728	0.	0.	0.	0.	0.	0.
18	0.137	7.283	0.	0.	0.	0.	0.	0.
19	0.145	6.896	0.	0.	0.	0.	0.	0.
20	0.153	6.543	1.0	0.1	0.	0.5260	0.	0.9837
21	0.161	6.225	2.0	0.3	1.1567	0.0281	1.1765	2.2001
22	0.168	5.936	9.0	1.3	1.0159	0.1890	1.2623	2.3605
23	0.176	5.673	2.0	0.3	0.6390	0.1283	0.7297	1.3665
24	0.184	5.432	10.0	1.4	0.7934	0.1363	0.9982	1.8667
25	0.192	5.211	15.0	2.1	0.6224	0.3226	1.1875	2.2207
26	0.200	5.007	57.0	7.9	0.5868	0.2852	1.1652	2.1790
27	0.208	4.819	27.0	5.8	0.5188	0.3081	1.0929	2.0437
28	0.215	4.664	9.0	1.3	0.4949	0.2947	1.1245	2.1029
29	0.223	4.481	2.0	0.3	0.4556	0.4454	0.7706	1.4410
30	0.231	4.330	7.0	1.0	0.3799	0.1296	0.5393	1.0085
31	0.239	4.188	21.0	2.9	0.3199	0.2192	0.8565	1.6017
32	0.247	4.055	19.0	2.4	0.4386	0.2070	0.9197	1.7198
33	0.254	3.931	11.0	1.5	0.2619	0.1329	0.5999	1.1218
34	0.262	3.814	5.0	0.7	0.1665	0.1151	0.3414	0.6384
35	0.270	3.703	0.	0.	0.	0.	0.	0.
36	0.278	3.599	0.	0.	0.	0.	0.	0.
37	0.286	3.501	0.	0.	0.	0.	0.	0.
38	0.293	3.408	0.	0.	0.	0.	0.	0.
39	0.301	3.319	0.	0.	0.	0.	0.	0.
40	0.309	3.235	0.	0.	0.	0.	0.	0.
41	0.317	3.156	0.	0.	0.	0.	0.	0.
42	0.325	3.060	0.	0.	0.	0.	0.	0.
43	0.333	3.007	0.	0.	0.	0.	0.	0.
44	0.340	2.938	0.	0.	0.	0.	0.	0.
45	0.348	2.872	0.	0.	0.	0.	0.	0.
46	0.356	2.809	0.	0.	0.	0.	0.	0.

(Continued)

(Sheet 5 of 6)

Table 1 (Continued)

LAND NUMBER (#)	WAVE FREQUENCY (HZ.)	WAVE PERIOD (SEC.)	VALID OBSERVATIONS (#)	PERCENT OF VALID RECORDS (%)	AVERAGE SIGNIFICANT WAVE HEIGHT (FT.)	STANDARD DEVIATION (FT.)	MAXIMUM OBSERVED SIGNIFICANT HEIGHT (FT.)	PROBABLE MAXIMUM WAVE HEIGHT (FT.)
					VALID WAVE HEIGHT (FT.)	SIGNIFICANT WAVE HEIGHT (FT.)	SIGNIFICANT WAVE HEIGHT (FT.)	
1	0.016	227.556	72.0	36.7	0.2886	0.1321	0.7749	1.4431
2	0.112	81.920	0.	0.	0.	0.	0.	0.
3	0.120	49.451	0.	0.	0.	0.	0.	0.
4	0.028	35.930	0.	0.	0.	0.	0.	0.
5	0.036	28.055	0.	0.	0.	0.	0.	0.
6	0.043	23.011	0.	0.	0.	0.	0.	0.
7	0.051	19.505	0.	0.	0.	0.	0.	0.
8	0.059	16.926	0.	0.	0.	0.	0.	0.
9	0.067	14.949	0.	0.	0.	0.	0.	0.
10	0.075	13.386	0.	0.	0.	0.	0.	0.
11	0.083	12.118	0.	0.	0.	0.	0.	0.
12	0.090	11.070	0.	0.	0.	0.	0.	0.
13	0.098	10.189	0.	0.	0.	0.	0.	0.
14	0.106	9.438	0.	0.	0.	0.	0.	0.
15	0.114	8.790	3.0	1.5	0.	0.	0.	0.
16	0.122	8.225	0.	0.	0.	0.	0.	0.
17	0.129	7.728	0.	0.	0.	0.	0.	0.
18	0.137	7.288	0.	0.	0.	0.	0.	0.
19	0.145	6.896	4.0	2.0	2.0985	1.6820	3.9030	7.2946
20	0.153	6.543	0.	0.	0.	0.	0.	0.
21	0.161	5.225	1.0	3.5	3.3137	0.	3.3137	6.1956
22	0.168	5.936	1.3	0.5	3.6791	0.	3.6791	6.8799
23	0.176	5.673	3.0	1.5	0.6541	0.7785	1.5529	2.9059
24	0.184	5.432	2.0	1.0	2.1846	2.8526	4.2016	7.8571
25	0.192	5.211	4.0	2.0	0.8049	0.9006	2.1943	4.1053
26	0.200	5.007	5.0	2.6	0.6799	0.4606	1.3708	2.5633
27	0.208	4.819	5.0	2.6	0.5176	0.6499	1.6793	3.1403
28	0.215	4.644	6.0	3.1	0.9229	1.0744	2.4561	6.5928
29	0.223	4.481	7.0	3.6	0.7278	0.9068	2.7127	5.0728
30	0.231	4.330	5.0	1.5	0.4678	0.2186	0.6412	1.1994
31	0.239	4.182	8.0	4.1	0.7503	0.4454	1.6016	2.9951
32	0.247	4.055	8.0	4.1	0.8116	0.3682	1.3896	2.5945
33	0.254	3.931	8.0	4.1	0.6390	0.5928	1.8819	3.5192
34	0.262	3.814	12.0	6.1	0.8059	0.5335	1.7645	3.2498
35	0.270	3.703	44.0	22.4	1.3047	1.4710	6.1057	11.4177
36	0.278	3.599	0.	0.	0.	0.	0.	0.
37	0.286	3.501	0.	0.	0.	0.	0.	0.
38	0.293	3.408	0.	0.	0.	0.	0.	0.
39	0.301	3.319	0.	0.	0.	0.	0.	0.
40	0.309	3.235	0.	0.	0.	0.	0.	0.
41	0.317	3.156	0.	0.	0.	0.	0.	0.
42	0.325	3.080	0.	0.	0.	0.	0.	0.
43	0.333	3.017	0.	0.	0.	0.	0.	0.
44	0.340	2.938	0.	0.	0.	0.	0.	0.
45	0.348	2.872	0.	0.	0.	0.	0.	0.
46	0.356	2.809	0.	0.	0.	0.	0.	0.

(Continued)

(Sheet 4 of 6)

Table 1 (Continued)

BAND NUMBER (#)	WAVE FREQUENCY (HZ.)	WAVE PERIOD (SEC.)	VALID OBSERVATIONS (#)	PERCENT VALID RECORDS (%)	AVERAGE SIGNIFICANT HEIGHT (FT.)	MAXIMUM SIGNIFICANT HEIGHT (FT.)	STANDARD DEVIATION (FT.)	PROBABLE MAXIMUM WAVE HEIGHT (FT.)
1	0.006	227.556	531.0	81.8	0.1686	0.1310	0.8597	1.6077
2	0.012	81.920	0	0	0	0	0	0
3	0.020	49.951	0	0	0	0	0	0
4	0.028	35.930	0	0	0	0	0	0
5	0.036	28.055	0	0	0	0	0	0
6	0.043	23.011	0	0	0	0	0	0
7	0.051	19.505	0	0	0	0	0	0
8	0.059	16.926	0	0	0	0	0	0
9	0.067	14.949	0	0	0	0	0	0
10	0.075	13.386	0	0	0	0	0	0
11	0.083	12.118	0	0	0	0	0	0
12	0.090	11.070	0	0	0	0	0	0
13	0.098	10.189	0	0	0	0	0	0
14	0.106	9.438	0	0	0	0	0	0
15	0.114	8.790	0	0	0	0	0	0
16	0.122	8.225	0	0	0	0	0	0
17	0.129	7.728	0	0	0	0	0	0
18	0.137	7.288	0	0	0	0	0	0
19	0.145	6.896	0	0	0	0	0	0
20	0.153	6.543	0	0	0	0	0	0
21	0.161	6.225	0	0	0	0	0	0
22	0.168	5.936	0	0	0	0	0	0
23	0.176	5.673	3.0	5.5	0.7953	0.9110	1.8165	1.8165
24	0.184	5.432	2.0	0.3	0.8267	0.1218	1.7071	1.7071
25	0.192	5.211	3.0	0.5	0.7045	0.4999	1.4451	2.1413
26	0.200	5.007	40.0	6.2	0.4771	0.3028	1.1847	2.2155
27	0.208	4.819	16.0	2.5	0.5098	0.2876	1.4558	2.1427
28	0.215	4.644	6.0	0.9	0.3325	0.2162	0.7648	1.4303
29	0.223	4.481	2.0	0.3	0.2536	0.1353	0.6532	0.6532
30	0.231	4.330	2.0	0.3	0.2098	0.0267	0.4250	0.4250
31	0.239	4.188	13.0	2.0	0.4122	0.1990	0.6898	1.6827
32	0.247	4.055	21.0	3.2	0.2293	0.1362	0.4769	0.8919
33	0.256	3.931	8.0	1.2	0.1696	0.1570	0.5056	0.9454
34	0.262	3.814	2.0	0.3	0.0858	0.1621	0.4165	0.4165
35	0.270	3.703	0	0	0	0	0	0
36	0.278	3.599	0	0	0	0	0	0
37	0.286	3.501	0	0	0	0	0	0
38	0.293	3.408	0	0	0	0	0	0
39	0.301	3.319	0	0	0	0	0	0
40	0.309	3.235	0	0	0	0	0	0
41	0.317	3.156	0	0	0	0	0	0
42	0.325	3.080	0	0	0	0	0	0
43	0.333	3.007	0	0	0	0	0	0
44	0.340	2.938	0	0	0	0	0	0
45	0.348	2.872	0	0	0	0	0	0
46	0.356	2.809	0	0	0	0	0	0

(Continued)

(Sheet 3 of 6)

Table 1 (Continued)

BAND NUMBER (#)	WAVE FREQUENCY (HZ.)	WAVE PERIOD (SEC.)	VALID OBSERVATIONS (N)	PERCENT OF VALID RECORDS (%)	AVERAGE SIGNIFICANT HEIGHT (FT.)	STANDARD DEVIATION (FT.)	MAXIMUM OBSERVED SIGNIFICANT HEIGHT (FT.)	PROBABLE MAXIMUM WAVE HEIGHT (FT.)
1	0.004	227.556	309.0	50.0	0.2370	0.1889	1.6843	3.1496
2	0.012	81.920	0.	0.	0.	0.	0.	0.
3	0.020	49.951	0.	0.	0.	0.	0.	0.
4	0.028	35.950	0.	0.	0.	0.	0.	0.
5	0.036	28.055	0.	0.	0.	0.	0.	0.
6	0.043	23.011	0.	0.	0.	0.	0.	0.
7	0.051	19.505	0.	0.	0.	0.	0.	0.
8	0.059	16.926	0.	0.	0.	0.	0.	0.
9	0.067	14.949	0.	0.	0.	0.	0.	0.
10	0.075	13.386	0.	0.	0.	0.	0.	0.
11	0.083	12.118	0.	0.	0.	0.	0.	0.
12	0.090	11.070	0.	0.	0.	0.	0.	0.
13	0.098	10.189	0.	0.	0.	0.	0.	0.
14	0.106	9.438	0.	0.	0.	0.	0.	0.
15	0.114	8.790	0.	0.	0.	0.	0.	0.
16	0.122	8.225	0.	0.	0.	0.	0.	0.
17	0.129	7.728	0.	0.	0.	0.	0.	0.
18	0.137	7.288	0.	0.	0.	0.	0.	0.
19	0.145	6.896	1.0	0.2	0.2821	0.	0.2821	0.5276
20	0.153	6.543	2.0	0.3	0.7734	0.3879	1.0477	1.9593
21	0.161	6.225	2.0	0.3	0.4401	0.2700	0.6310	1.1800
22	0.168	5.936	7.0	1.1	2.4874	0.9481	4.1169	7.6985
23	0.176	5.673	2.0	0.3	1.1479	1.0747	1.9078	3.5677
24	0.184	5.432	4.0	0.6	0.3512	0.2188	0.6714	1.2556
25	0.192	5.211	11.0	1.8	1.0902	0.8903	3.0312	5.6684
26	0.200	5.007	15.0	2.4	0.6942	1.0701	3.9156	7.3222
27	0.208	4.819	42.0	6.8	0.5808	0.7356	3.0816	5.7626
28	0.215	4.644	14.0	2.3	1.1598	1.0871	3.7098	6.9374
29	0.223	4.481	20.0	3.2	1.1090	0.8730	2.9884	5.5883
30	0.231	4.330	12.0	1.9	1.1427	0.7864	2.5656	4.7977
31	0.239	4.188	17.0	2.8	0.9396	0.7557	2.8343	5.3002
32	0.247	4.055	28.0	4.5	0.9734	0.7638	3.0238	5.6546
33	0.254	3.931	19.0	3.1	0.9642	0.7057	2.7709	5.1817
34	0.262	3.814	36.0	5.8	0.6336	0.7458	3.3155	6.1999
35	0.270	3.703	75.0	12.1	0.7515	0.7981	3.3552	6.2742
36	0.278	3.599	2.0	0.3	0.0613	0.2295	0.2729	0.5103
37	0.286	3.501	0.	0.	0.	0.	0.	0.
38	0.293	3.408	0.	0.	0.	0.	0.	0.
39	0.301	3.319	0.	0.	0.	0.	0.	0.
40	0.309	3.235	0.	0.	0.	0.	0.	0.
41	0.317	3.156	0.	0.	0.	0.	0.	0.
42	0.325	3.080	0.	0.	0.	0.	0.	0.
43	0.333	3.007	0.	0.	0.	0.	0.	0.
44	0.340	2.938	0.	0.	0.	0.	0.	0.
45	0.348	2.872	0.	0.	0.	0.	0.	0.
46	0.356	2.809	0.	0.	0.	0.	0.	0.

(Continued)

(Sheet 2 of 6)

Table 1

Wave Data Statistical Analysis Summary, Ludington Harbor, Michigan, Gage 7; Ludington Harbor Channel, 26 May 1983 - 25 July 1983, Data Recovery Rate: 98.6%

DAUD NUMBER (#)	WAVE FREQUENCY (HZ.)	WAVE PERIOD (SEC.)	VALID OBSERVATIONS (#)	PERCENT OF VALID RECORDS (%)	AVERAGE SIGNIFICANT HEIGHT (FT.)	STANDARD DEVIATION (FT.)	MAXIMUM OBSERVED SIGNIFICANT HEIGHT (FT.)	PROBABLE MAXIMUM WAVE HEIGHT (FT.)
1	0.006	227.556	695.0	96.9	0.1485	0.1255	1.1932	2.0443
2	0.012	31.920	0.	0.	0.	0.	0.	0.
3	0.020	40.951	0.	0.	0.	0.	0.	0.
4	0.028	35.930	0.	0.	0.	0.	0.	0.
5	0.035	28.055	0.	0.	0.	0.	0.	0.
6	0.043	23.011	0.	0.	0.	0.	0.	0.
7	0.051	19.505	0.	0.	0.	0.	0.	0.
8	0.059	16.926	0.	0.	0.	0.	0.	0.
9	0.067	14.949	0.	0.	0.	0.	0.	0.
10	0.075	13.386	0.	0.	0.	0.	0.	0.
11	0.083	12.118	0.	0.	0.	0.	0.	0.
12	0.090	11.073	0.	0.	0.	0.	0.	0.
13	0.093	10.139	0.	0.	0.	0.	0.	0.
14	0.106	9.438	0.	0.	0.	0.	0.	0.
15	0.114	8.790	0.	0.	0.	0.	0.	0.
16	0.122	8.225	0.	0.	0.	0.	0.	0.
17	0.129	7.728	0.	0.	0.	0.	0.	0.
18	0.137	7.288	0.	0.	0.	0.	0.	0.
19	0.145	6.896	0.	0.	0.	0.	0.	0.
20	0.153	6.543	0.	0.	0.	0.	0.	0.
21	0.161	6.225	0.	0.	0.	0.	0.	0.
22	0.169	5.936	0.	0.	0.	0.	0.	0.
23	0.176	5.673	0.	0.	0.	0.	0.	0.
24	0.184	5.432	0.	0.	0.	0.	0.	0.
25	0.192	5.211	1.0	0.1	0.2392	0.0255	0.2592	0.4473
26	0.203	5.007	1.0	0.1	0.2055	0.1759	0.2055	0.3843
27	0.208	4.819	6.0	0.8	0.0221	0.3289	0.0221	0.5639
28	0.215	4.644	4.0	0.6	0.0850	0.3042	0.0850	0.3486
29	0.223	4.481	1.0	0.1	0.1864	0.2212	0.1864	0.2656
30	0.231	4.330	1.0	0.1	0.1426	0.1426	0.1426	0.9072
31	0.237	4.188	3.0	0.4	0.2610	0.2021	0.4851	1.2676
32	0.247	4.055	2.0	0.3	0.4583	0.3169	0.4583	0.5926
33	0.251	3.931	3.0	0.4	0.2132	0.1462	0.2132	0.3169
34	0.262	3.814	0.	0.	0.	0.	0.	0.
35	0.273	3.702	0.	0.	0.	0.	0.	0.
36	0.278	3.599	0.	0.	0.	0.	0.	0.
37	0.286	3.501	0.	0.	0.	0.	0.	0.
38	0.293	3.408	0.	0.	0.	0.	0.	0.
39	0.301	3.319	0.	0.	0.	0.	0.	0.
40	0.309	3.235	0.	0.	0.	0.	0.	0.
41	0.317	3.156	0.	0.	0.	0.	0.	0.
42	0.325	3.080	0.	0.	0.	0.	0.	0.
43	0.333	3.007	0.	0.	0.	0.	0.	0.
44	0.340	2.938	0.	0.	0.	0.	0.	0.
45	0.348	2.872	0.	0.	0.	0.	0.	0.
46	0.355	2.819	0.	0.	0.	0.	0.	0.

(Continued)

(Sheet 1 of 6)

#### PART IV: CONCLUSIONS

10. Evaluation of the data presented herein led to the following conclusions.

11. Significant wave heights in Lake Michigan during the period of observation ranged from less than 1.0 ft to a maximum of 8.8 ft. Significant wave heights in Ludington Harbor Channel ranged from less than 1.0 ft to a maximum of 1.3 ft. The greatest peak period observed in Lake Michigan during the period of observation was 8.8 sec; the greatest peak period observed in the Ludington Harbor Channel ranged from about 6.2 sec to about 6.5 sec.\*

12. Inspection of peak periods occurring simultaneously in the lake and harbor channel indicate a very close relationship between the periods up to a maximum of about 6 sec. During times when the peak period in Lake Michigan exceeds 6 sec, the period in the harbor channel is still about 6 sec. It appears the geometrical configuration of Ludington Harbor does not permit waves of periods greater than about 6 sec irrespective of the periods of the waves entering the harbor from Lake Michigan.

13. Comparison of the wind and wave records indicates that periods of greatest wave activity in the harbor channel coincide with periods when the winds are from almost due west. It is during these periods that the peak of the wave spectra obtained in the harbor channel closely match the peak of the spectra obtained in Lake Michigan; thus it is reasonable to assume that the waves observed in the channel are propagating in from Lake Michigan. However, when the wind is from directions other than very close to due west, there is almost no wave activity observed in the harbor channel even though the significant wave height in Lake Michigan just outside the harbor exceeds 4 ft. Conversely, when the wind is from almost due west, the significant wave height in the harbor channel approaches the observed maximum of 1.3 ft even though the significant wave height in Lake Michigan at the time is only about 2 ft.

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\* The periods of 227.556 shown in Tables 2, 3, and 4 are a consequence of spectrally analyzing wave records obtained during calm conditions and are ignored for the purpose of this discussion.

Table 2 (Continued)

RECORD NUMBER	JULIAN DATE	TIME	B&D POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)	RECORD NUMBER	JULIAN DATE	TIME	B&D POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)
407	179	1250	0	227.556	0.090	323	179	430	0	227.556	0.258
407	179	1430	0	227.556	0.086	420	179	630	0	4.644	0.226
401	179	1610	0	227.556	0.059	421	179	830	0	4.644	0.348
402	179	1810	0	227.556	0.062	422	179	1030	0	227.556	0.263
413	179	2050	0	227.556	0.204	423	179	1230	0	4.631	0.234
404	179	2130	0	227.556	0.079	424	179	1430	0	5.332	0.261
405	180	50	0	227.556	0.145	425	179	1630	0	227.556	0.335
406	180	210	0	227.556	0.155	426	179	1830	0	227.556	0.336
407	180	430	0	227.556	0.213	427	179	2030	0	227.556	0.448
408	180	630	0	227.556	0.094	428	179	2230	0	227.556	0.370
409	180	830	0	227.556	0.060	429	179	30	1	227.556	0.311
410	180	1050	0	227.556	0.051	430	180	230	0	227.556	0.320
411	180	1250	0	227.556	0.071	431	180	430	0	227.556	0.429
412	180	1430	0	227.556	0.164	432	180	630	0	227.556	0.321
413	180	1630	0	227.556	0.080	433	180	830	0	4.644	0.363
414	180	1850	0	227.556	0.150	434	180	1030	0	4.819	0.248
415	180	2050	0	227.556	0.237	435	180	1230	0	227.556	0.211
416	180	2250	0	227.556	0.254	436	180	1430	0	227.556	0.251
417	181	50	0	227.556	0.129	437	180	1630	0	5.814	0.237
418	181	210	0	227.556	0.097	438	180	1830	0	3.911	0.352
419	181	430	0	227.556	0.116	439	180	2030	0	4.819	0.351
420	181	630	0	227.556	0.082	440	180	2230	0	4.481	0.326
421	181	830	0	227.556	0.141	421	181	30	0	227.556	0.400
422	181	1050	0	227.556	0.067	422	181	230	0	4.819	0.342
423	181	1250	0	227.556	0.133	423	181	430	0	4.818	0.426
424	181	1430	0	227.556	0.114	424	181	630	0	3.703	0.616
425	181	1630	0	227.556	0.243	425	181	830	0	4.055	0.645
426	181	1850	0	227.556	0.155	426	181	1030	0	227.556	0.571
427	181	2050	0	227.556	0.119	427	181	1230	0	4.481	0.456
428	181	2250	0	227.556	0.210	428	181	1430	0	4.055	0.118
429	182	50	0	227.556	0.167	429	181	1630	0	3.814	1.579
430	182	210	0	227.556	0.167	430	181	1830	0	4.350	1.755
431	182	430	0	227.556	0.165	431	181	2030	0	4.819	1.725
432	182	630	0	227.556	0.365	432	181	2230	0	4.481	1.666
433	182	830	0	227.556	0.282	433	181	30	0	4.481	0.074
434	182	1050	0	227.556	0.180	434	182	230	0	4.789	0.689
435	182	1250	0	227.556	0.210	435	182	430	0	3.703	0.773
436	182	1430	0	227.556	0.167	436	182	630	0	4.350	1.684
437	182	1630	0	227.556	0.167	437	182	830	0	4.819	1.865
438	182	1850	0	227.556	0.391	438	182	1030	0	4.644	1.960
439	182	2050	0	227.556	0.255	439	182	1230	0	5.211	1.459
440	182	2250	0	227.556	0.650	440	182	1430	0	4.819	1.231
441	183	50	0	227.556	0.326	441	183	1630	0	227.556	1.303
442	183	210	0	227.556	0.614	442	183	830	0	5.936	1.561
443	183	430	0	227.556	0.444	443	183	1030	0	5.073	1.900
444	183	630	0	227.556	0.695	444	183	1230	0	227.556	0.647
445	183	830	0	227.556	0.235	445	183	1430	0	5.211	2.021
446	183	1050	0	227.556	0.743	446	183	1630	0	227.556	0.491
447	183	1250	0	227.556	0.155	447	183	1830	0	4.644	1.459
448	183	1430	0	227.556	0.614	448	183	2030	0	6.896	0.282
449	183	1630	0	227.556	0.444	449	183	2230	0	5.703	2.362
450	183	1850	0	227.556	0.695	450	183	30	0	5.936	1.677
451	183	2050	0	227.556	0.235	451	183	2230	0	5.211	1.083
452	183	2250	0	227.556	1.093	452	183	30	0	227.556	0.639
453	184	50	0	227.556	0.605	453	183	1230	0	6.896	0.282
454	184	210	0	227.556	0.215	454	183	1430	0	5.703	2.362
455	184	430	0	227.556	0.267	455	183	1630	0	6.896	1.677
456	184	630	0	227.556	0.103	456	183	1830	0	5.211	1.083
457	184	830	0	227.556	0.137	457	183	2030	0	5.703	2.362

(Continued)

(Sheet 8 of 13)

Table 2 (Continued)

RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)	RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)
455	194	1010	0	227.556	0.06	458	184	230	7	3.703	0.558
459	184	1230	0	5.007	0.205	459	184	430	0	3.814	0.530
460	184	1410	0	5.211	0.239	460	184	610	6	3.703	2.043
461	184	1610	0	227.556	0.232	461	184	830	5	3.814	3.315
462	184	1810	0	227.556	0.054	462	184	1050	0	4.681	2.985
463	184	2130	0	227.556	0.715	463	184	1250	6	4.610	5.002
464	184	2210	0	227.556	0.457	464	184	1430	7	5.211	5.031
465	185	30	0	227.556	0.325	465	184	1630	2	4.819	2.834
466	185	230	0	227.556	0.611	466	184	1830	10	3.931	2.771
467	185	430	0	227.556	0.864	467	184	2030	12	4.188	2.834
468	185	610	0	227.556	0.338	468	184	2250	0	4.644	3.700
469	185	810	0	227.556	0.770	469	184	2450	16	5.002	3.916
470	185	1030	0	227.556	0.612	470	185	2650	15	5.936	4.117
471	185	1230	0	227.556	0.269	471	185	430	0	5.936	2.929
472	185	1410	0	227.556	0.261	472	185	630	16	5.936	3.159
473	185	1610	0	227.556	0.140	473	185	830	15	3.355	3.355
474	185	1810	0	227.556	0.402	474	185	1030	0	6.055	5.024
475	185	2030	0	227.556	0.275	475	185	1230	17	3.703	3.295
476	185	2230	0	227.556	0.355	476	185	1430	18	5.916	2.150
477	186	30	0	227.556	0.350	477	185	1630	0	5.936	1.880
478	186	230	0	1.931	0.317	478	185	1830	19	5.211	1.537
479	186	410	0	4.188	0.485	479	185	2030	21	0	0
480	186	610	0	227.516	0.309	480	185	2230	0	4.664	1.210
481	186	810	24	0	0	481	186	30	23	0	0
482	186	1030	0	227.556	0.121	482	186	50	26	0	0
483	186	1230	0	227.556	0.224	483	186	70	26	0	0
484	186	1430	0	227.556	0.135	484	186	90	26	0	0
485	186	1630	0	227.556	0.191	485	186	110	22	0	0
486	186	1830	0	227.556	0.102	486	186	130	22	0	0
487	186	2030	0	227.556	0.256	487	186	150	0	3.703	1.144
488	186	2230	0	227.556	0.122	488	186	170	22	0	0
489	186	2430	0	227.556	0.133	489	186	190	23	0	0
490	187	30	0	227.556	0.092	490	186	210	26	0	0
491	187	430	0	227.556	0.135	491	186	230	20	4.188	2.144
492	187	630	0	227.556	0.054	492	186	250	20	3.703	5.261
493	187	830	0	227.556	0.150	493	186	270	0	3.703	0.456
494	187	1010	0	227.556	0.070	494	187	30	8	3.814	2.681
495	187	1210	0	227.556	0.057	495	187	50	4	3.703	0.410
496	187	1430	0	227.556	0.063	496	187	70	26	227.556	0.269
497	187	1630	0	227.556	0.132	497	187	90	4	3.814	0.344
498	187	1830	0	227.556	0.065	498	187	110	4	227.556	0.219
499	187	2030	0	227.556	0.143	499	187	130	4	3.703	0.764
500	187	2230	0	227.556	0.150	500	187	150	4	6.225	0.259
501	188	30	0	227.556	0.167	501	187	170	4	5.007	0.247
502	188	210	0	227.556	0.172	502	187	190	4	227.556	0.244
503	188	430	0	227.556	0.032	503	187	210	0	227.556	0.190
504	188	650	0	227.556	0.085	504	187	230	0	3.814	0.220
505	188	850	0	227.556	0.161	505	187	250	0	4.819	0.269
506	188	1030	0	227.556	0.137	506	187	270	0	227.556	0.218
507	188	1250	0	227.556	0.166	507	188	290	2	3.703	0.679
508	188	1410	0	227.556	0.282	508	188	310	2	3.703	0.696
509	188	1650	0	227.556	0.229	509	188	330	0	3.703	0.974
510	188	1850	0	227.556	0.136	510	188	350	0	3.703	1.008
511	188	2030	0	227.556	0.139	511	188	370	0	3.703	1.074
512	188	2230	0	227.556	0.230	512	188	390	0	4.350	1.438
513	189	30	0	227.556	0.147	513	188	410	0	3.703	1.074
514	189	250	0	227.556	0.137	514	188	430	0	3.703	1.074
515	189	430	0	227.556	0.163	515	188	450	0	3.703	1.074
516	189	650	0	227.556	0.049	516	188	470	0	4.350	1.438

(Continued)

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Table 2 (Continued)

RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)	RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)
517	189	830	0	227.556	0.153	517	189	30	11	4.188	1.134
518	189	1030	0	227.556	0.200	518	189	230	10	4.055	1.268
519	189	1230	0	227.556	0.265	519	189	430	0	4.055	1.078
520	189	1430	0	227.556	0.364	520	189	630	9	4.188	1.356
521	189	1630	0	227.556	0.444	521	189	830	11	4.481	1.205
522	189	1830	0	227.556	0.255	522	189	1030	0	5.931	1.598
523	189	2030	0	227.556	0.260	523	189	1230	10	4.055	1.443
524	189	2230	0	227.556	0.176	524	189	1430	10	4.055	2.175
525	190	30	0	4.819	0.121	525	189	1630	0	4.481	2.231
526	190	210	0	4.644	0.102	526	189	1830	10	4.481	2.262
527	190	430	0	227.556	0.224	527	189	2030	9	3.931	2.299
528	190	630	0	227.556	0.034	528	189	2230	0	4.330	2.008
529	190	830	0	227.556	0.059	529	190	30	17	4.188	1.533
530	190	1030	0	227.556	0.075	530	190	50	11	4.481	1.338
531	190	1230	0	227.556	0.110	531	190	70	0	0.833	0.833
532	190	1430	0	227.556	0.129	532	190	90	0	0.633	0.633
533	190	1630	0	227.556	0.123	533	190	110	18	4.055	2.566
534	190	1830	0	227.556	0.065	534	190	130	0	5.211	0.419
535	190	2030	0	227.556	0.109	535	190	150	18	3.703	1.072
536	190	2230	0	227.556	0.311	536	190	170	0	227.556	0.158
537	191	30	0	227.556	0.080	537	190	190	0	3.814	0.213
538	191	230	0	227.556	0.080	538	190	210	0	227.556	0.213
539	191	410	0	227.556	0.063	539	190	230	19	3.703	0.261
540	191	610	0	227.556	0.075	540	190	250	0	227.556	0.261
541	191	810	0	227.556	0.024	541	191	270	0	227.556	0.274
542	191	1030	0	227.556	0.031	542	191	290	17	227.556	0.344
543	191	1230	0	227.556	0.067	543	191	310	0	227.556	0.293
544	191	1430	0	227.556	0.114	544	191	330	16	227.556	0.262
545	191	1630	1	227.556	0.059	545	191	350	16	227.556	0.192
546	191	1830	0	227.556	0.087	546	191	370	0	227.556	0.207
547	191	2030	0	227.556	0.071	547	191	390	0	227.556	0.207
548	191	2230	0	227.556	0.074	548	191	410	19	227.556	0.182
549	192	30	0	227.556	0.181	549	191	430	15	3.814	0.498
550	192	230	0	227.556	0.071	550	191	450	0	227.556	0.265
551	192	430	0	227.556	0.162	551	191	470	20	227.556	0.239
552	192	630	0	227.556	0.162	552	191	490	19	3.703	0.922
553	192	830	0	227.556	0.087	553	191	510	8	4.819	0.142
554	192	1030	0	227.556	0.099	554	192	530	0	0.0	0.0
555	192	1230	0	227.556	0.077	555	192	550	22	0	227.556
556	192	1430	0	227.556	0.108	556	192	570	0	0.101	0.101
557	192	1630	0	227.556	0.205	557	192	590	18	3.703	2.085
558	192	1830	0	227.556	0.130	558	192	610	27	0	0.0
559	192	2030	0	227.556	0.192	559	192	630	0	3.814	0.221
560	192	2230	0	227.556	0.139	560	192	650	0	0.0	0.0
561	193	30	0	227.556	0.228	561	192	670	34	0	0.0
562	193	210	0	227.556	0.104	562	192	690	34	0	0.0
563	193	410	0	227.556	0.101	563	192	710	0	3.703	0.645
564	193	610	0	227.556	0.073	564	192	730	43	0	0.0
565	193	810	0	227.556	0.134	565	192	750	0	3.703	1.280
566	193	1010	0	227.556	0.121	566	193	770	0	0.0	0.0
567	193	1210	0	227.556	0.126	567	193	790	34	0	0.0
568	193	1430	0	227.556	0.036	568	193	810	1	3.703	0.812
569	193	1630	0	227.556	0.042	569	193	830	41	0	0.0
570	193	1830	0	227.556	0.042	570	193	850	38	0	0.0
571	193	2030	0	227.556	0.105	571	193	870	0	3.814	0.412
572	193	2230	0	227.556	0.121	572	193	890	35	0	0.0
573	194	30	0	227.556	0.075	573	193	910	39	0	0.0
574	194	210	0	227.556	0.096	574	193	930	0	4.188	0.221
575	194	430	0	227.556	0.103	575	193	950	37	0	0.0

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Table 2 (Continued)

RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. MT. (FT.)	RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. MT. (FT.)
577	194	6.10	0	227.555	0.108	576	193	2230	0	227.555	0.139
577	194	630	0	227.555	0.097	577	194	230	39	0	0
578	194	1710	0	227.555	0.122	578	194	230	38	0	0
579	194	1710	0	227.555	0.072	579	194	230	0	227.555	0.061
580	194	1610	0	227.555	0.041	580	194	630	38	0	0
581	194	1610	0	227.555	0.064	581	194	630	40	0	0
582	194	1810	0	227.555	0.071	582	194	1030	0	227.555	0.167
583	194	2030	0	227.555	0.132	583	194	1230	38	0	0
584	194	2230	0	227.555	0.086	584	194	1430	35	0	0
585	195	10	0	227.555	0.027	585	194	1630	0	227.555	0.117
586	195	210	0	227.555	0.037	586	194	1830	38	0	0
587	195	410	0	227.555	0.076	587	194	2030	50	0	0
588	195	630	0	227.555	0.104	588	194	2230	7	4.817	0.155
589	195	830	0	227.555	0.135	589	195	30	44	0	0
590	195	1030	0	227.555	0.100	590	195	230	43	0	0
591	195	1230	0	227.555	0.123	591	195	430	0	227.555	0.071
592	195	1410	0	227.555	0.055	592	195	630	49	0	0
593	195	1630	0	227.555	0.045	593	195	830	61	0	0
594	195	1830	0	227.555	0.050	594	195	1030	0	227.555	0.323
595	195	2030	0	227.555	0.120	595	195	1230	50	0	0
596	195	2230	0	227.555	0.096	596	195	1430	34	0	0
597	196	30	0	227.555	0.057	597	195	1630	11	1.931	1.337
598	196	210	0	227.555	0.110	598	195	1830	7	0	0
599	196	410	0	227.555	0.036	599	195	2030	2	0	0
600	196	630	0	227.555	0.027	600	195	2230	5	0	0
601	196	830	0	227.555	0.070	601	196	1030	0	227.555	0.323
602	196	1030	0	227.555	0.120	602	196	1230	50	0	0
603	196	1230	0	227.555	0.069	603	196	1430	34	0	0
604	196	1430	0	227.555	0.057	604	196	1630	11	1.931	1.337
605	196	1630	0	227.555	0.024	605	196	1830	7	0	0
606	196	1830	0	227.555	0.110	606	196	2030	2	0	0
607	196	2030	0	227.555	0.036	607	196	2230	5	0	0
608	196	2230	0	227.555	0.062	608	196	1030	4	1.230	0.323
609	197	30	0	227.555	0.124	609	196	1230	7	0	0
610	197	210	0	227.555	0.035	610	196	1430	4	0	0
611	197	410	0	227.555	0.056	611	196	1630	10	0	0
612	197	630	0	227.555	0.164	612	196	1830	6	2.230	0
613	197	830	0	227.555	0.030	613	196	2030	7	0	0
614	197	1030	0	227.555	0.049	614	197	2230	5	0	0
615	197	1230	0	227.555	0.114	615	197	1030	4	1.230	0.323
616	197	1430	0	227.555	0.066	616	197	1230	7	0	0
617	197	1630	0	227.555	0.067	617	197	1430	4	0	0
618	197	1830	0	227.555	0.117	618	197	1630	3	1.931	1.337
619	197	2030	0	227.555	0.056	619	197	1830	8	0	0
620	197	2230	0	227.555	0.164	620	197	2030	5	1.230	0
621	198	30	0	227.555	0.032	621	197	2230	6	2.230	0
622	198	230	0	227.555	0.058	622	197	1030	7	0	0
623	198	430	0	227.555	0.104	623	197	1230	4	1.230	0.323
624	198	630	0	227.555	0.067	624	197	1430	3	1.931	1.337
625	198	830	0	227.555	0.164	625	197	1630	8	0	0
626	198	1030	0	227.555	0.122	626	197	1830	5	1.230	0
627	198	1230	0	227.555	0.077	627	197	2030	6	2.230	0
628	198	1430	0	227.555	0.097	628	198	2230	5	1.230	0
629	198	1630	0	227.555	0.244	629	198	1030	4	1.230	0.323
630	198	1830	0	227.555	0.100	630	198	1230	7	0	0
631	198	2030	0	227.555	0.158	631	198	1430	3	1.931	1.337
632	198	2230	0	227.555	0.150	632	198	1630	8	0	0
633	198	130	0	227.555	0.170	633	198	1830	5	1.230	0
634	198	250	0	227.555	0.057	634	198	2030	6	2.230	0

(Continued)

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Table 2 (Continued)

RECORD NUMBER	JULIAN DATE	TIME	SIG. PER. (SEC.)	SIG. HT. (FT.)	BAD POINTS	RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)
615	191	4:57	0	227.556	0.149	615	198	2030	7	0	0
619	192	6:57	0	227.556	0.149	626	198	2230	9	0	0
637	199	1:57	0	227.556	0.210	637	199	210	5	0	0
638	199	10:57	0	227.556	0.267	638	199	210	11	0	0
639	199	12:50	0	227.556	0.241	639	199	210	14	0	0
641	197	1:45	5	227.556	0.195	641	199	210	11	0	0
641	199	16:51	5	227.556	0.221	641	199	210	13	0	0
642	199	18:50	0	227.556	0.346	642	199	210	14	0	0
643	199	20:50	0	227.556	0.186	643	199	1230	4	0	0
644	199	22:50	0	227.556	0.147	644	199	1230	4	0	0
645	200	3:50	0	227.556	0.057	645	199	1630	8	0.491	0
646	200	7:50	0	227.556	0.181	646	199	1830	11	0	0
647	200	4:51	0	227.556	0.341	647	199	2030	20	0	0
648	200	6:53	0	227.556	0.137	648	199	2230	22	0	0
649	200	8:49	0	227.556	0.036	649	200	210	12	0	0
650	200	10:50	0	227.556	0.057	650	200	210	24	0	0
651	200	12:50	0	227.556	0.226	651	200	210	27	0	0
652	200	14:57	0	227.556	0.064	652	200	210	27	0	0
653	200	16:50	0	227.556	0.072	653	200	210	27	0	0
654	200	18:50	256	0	0	654	200	210	38	0	0
655	200	20:50	795	0	0	655	200	1230	3	227.556	0.102
656	200	22:50	0	227.556	0.113	656	200	1230	15	227.556	0.082
657	201	0	0	227.556	0.171	657	200	1630	0	227.556	0.256
658	201	2:50	0	227.556	0.374	658	200	1830	15	227.556	0.229
659	201	4:57	0	227.556	0.801	659	200	2030	0	227.556	0.098
660	201	6:51	0	227.556	0.417	660	200	2230	0	227.556	0.282
661	201	8:10	0	227.556	0.780	661	201	210	0	227.556	0.702
662	201	10:10	0	227.556	0.676	662	201	230	0	227.556	0.783
663	201	12:50	0	227.556	0.435	663	201	230	0	227.556	0.573
664	201	14:50	0	227.556	0.345	664	201	230	12	0.814	0.316
665	201	16:50	0	227.556	0.269	665	201	230	35	0	0
666	201	18:50	0	227.556	0.531	666	201	230	35	0	0
667	201	20:50	0	227.556	0.227	667	201	1030	0	227.556	1.461
668	201	22:50	0	227.556	0.158	668	201	1230	0	227.556	0.898
669	202	10	0	227.556	2.165	669	201	1430	0	227.556	1.173
670	202	2:50	0	227.556	0.502	670	201	1630	0	227.556	1.218
671	202	4:50	0	227.556	0.379	671	201	1830	0	227.556	0.977
672	202	6:50	0	227.556	0.112	672	201	2030	14	0.430	0.702
673	202	8:50	0	227.556	0.084	673	201	2230	0	227.556	0.733
674	202	10:50	0	227.556	0.346	674	202	230	23	0	0
675	202	12:50	0	227.556	0.295	675	202	230	9	0.931	0.409
676	202	14:50	0	227.556	0.490	676	202	230	0	227.556	0.442
677	202	16:50	0	227.556	0.379	677	202	230	18	0.388	1.218
678	202	18:50	0	227.556	0.464	678	202	230	14	0.330	0.977
679	202	20:50	0	227.556	0.441	679	202	1030	14	0.435	0.702
680	202	22:50	0	227.556	0.155	680	202	1230	0	227.556	0.733
681	203	1:50	0	227.556	0.135	681	202	1430	42	0	0
682	203	3:50	0	227.556	0.101	682	202	1630	0	227.556	0.339
683	203	4:50	0	227.556	0.133	683	202	1830	27	0	0
684	203	6:50	0	227.556	0.268	684	202	2030	39	0	0
685	203	8:50	0	227.556	0.091	685	202	2230	0	227.556	0.321
686	203	10:50	0	227.556	0.236	686	203	230	3	227.556	0.369
687	203	12:50	0	227.556	0.120	687	203	230	0	227.556	0.369
688	203	14:50	0	227.556	0.473	688	203	230	34	0	0
689	203	16:50	0	227.556	0.256	689	203	230	26	0	0
690	203	18:50	0	227.556	0.731	690	203	230	0	227.556	0.606
691	203	20:50	0	227.556	0.476	691	203	1030	27	0	0
692	203	22:50	0	227.556	0.278	692	203	1230	27	0	0
693	204	5:50	0	227.556	0.115	693	203	1430	0	0.819	0.484

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Table 2 (Concluded)

RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. MT. (FT.)	RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. MT. (FT.)
694	204	2110	0	227.556	0.154	694	203	1830	31	0	0
695	204	410	0	227.556	0.202	695	203	2030	53	0	0
696	204	610	0	227.556	0.272	696	203	2230	22	0	0
697	204	810	0	227.556	0.059	697	204	30	35	0	0
698	204	1010	0	227.556	0.118	698	204	230	39	0	0
699	204	1210	0	227.556	0.170	699	204	430	0	227.556	0.297
700	204	1410	0	227.556	0.058	700	204	610	0	227.556	0.095
701	204	1657	0	227.556	0.124	701	204	810	9	0	227.556
702	204	1830	0	227.556	0.086	702	204	1030	0	227.556	0.361
703	204	2010	0	227.556	0.284	703	204	1230	0	227.556	0.307
704	204	2210	0	227.556	0.116	704	204	1430	36	0	0
705	204	2350	0	227.556	0.116	705	204	1630	15	0	0
706	205	210	0	227.556	0.434	706	204	1830	9	0	0
707	205	430	0	227.556	0.385	707	204	2030	7	0	0
708	205	630	0	227.556	0.132	708	204	2230	0	0	0
709	205	810	0	227.556	0.155	709	205	30	14	0	0
710	205	1110	0	227.556	0.216	710	205	230	0	0	0
711	205	1230	0	227.556	0.064	711	205	430	5	0	0
712	205	1430	0	227.556	0.056	712	205	630	1	0	0
713	205	1630	0	227.556	0.110	713	205	830	0	0	0
714	205	1810	0	227.556	0.200	714	205	1030	1	0	21.931
715	205	2030	0	227.556	0.116	715	205	1230	24	0	0
716	205	2250	16	227.556	0.167	716	205	1430	0	3.931	0.548
717	205	217	204	227.556	0.117	717	205	1630	0	3.703	0.689
718	206	210	0	227.556	0.110	718	205	1830	2	3.931	0.941
719	206	430	0	227.556	0.198	719	205	2030	0	4.644	0.945
720	206	630	0	227.556	0.049	720	205	2230	0	3.931	0.605
721	206	810	0	227.556	0.112	721	206	30	3.931	0.232	
722	206	1010	0	227.556	0.065	722	206	50	3.703	0.179	
723	206	1230	0	227.556	0.073	723	206	70	4.481	0.277	
724	206	1430	0	227.556	0.112	724	206	930	227.556	0.309	
725	206	1630	0	227.556	0.100	725	206	1130	3.703	0.319	
726	206	1830	14	227.556	0.188	726	206	1330	4.819	0.316	
727	206	2030	1017	0.	0.	727	207	1530	5.211	0.360	
										227.556	0.314
										227.556	0.334
										4.364	0.334
										5.432	0.179
										5.211	0.315
										227.556	0.214
										3.703	0.353
										227.556	0.278
										227.556	0.154
										227.556	0.169
										227.556	0.197
										227.556	0.205
										4.819	0.334
										5.007	0.214
										5.432	0.293
										5.211	0.262
										5.31	0.

(Sheet 13 of 13)

Table 3  
Wave Data Record Summary

a. Gage 7; Ludington Harbor Channel  
11 August 1983 - 4 October 1983  
Data Recovery Rate: 99.1%

b. Gage 9; Lake Michigan Site  
11 August 1983 - 4 October 1983  
Data Recovery Rate: 29.7%

RECORD NUMBER	JULIAN DATE	TIME	WAD POINTS	SIG. PER. (SEC.)	SIG. HGT. (ft.)	RECORD NUMBER	JULIAN DATE	TIME	WAD POINTS	SIG. PER. (SEC.)	SIG. HGT. (ft.)
1	223	200	19	0.	0.	1	223	200	0	0.	0.
2	223	400	0	0.	0.	2	223	400	17	0.	0.
3	223	600	0	0.	0.	3	223	600	21	0.	0.
4	223	800	0	0.	0.	4	223	800	16	0.	0.
5	223	1000	0	0.	0.	5	223	1000	5	0.007	1.371
6	223	1200	0	0.	0.	6	223	1200	0	0.	0.
7	223	1400	0	0.	0.	7	223	1400	0	0.	0.
8	223	1600	0	0.	0.	8	223	1600	0	0.	0.
9	223	1800	0	0.	0.	9	223	1800	0	0.	0.
10	223	2000	0	0.	0.	10	223	2000	16	6.976	1.084
11	223	2200	0	0.	0.	11	223	2200	0	0.	0.
12	223	2400	0	0.	0.	12	223	2400	0	0.	0.
13	224	200	0	0.	0.	13	224	200	0	0.	0.
14	224	400	0	0.	0.	14	224	200	0	0.	0.
15	224	600	0	0.	0.	15	224	400	0	0.	0.
16	224	800	0	0.	0.	16	224	600	0	0.	0.
17	224	1000	0	0.	0.	17	224	800	0	0.	0.
18	224	1200	0	0.	0.	18	224	1000	0	0.	0.
19	224	1400	0	0.	0.	19	224	1200	0	0.	0.
20	224	1600	0	0.	0.	20	224	1400	0	0.	0.
21	224	1800	0	0.	0.	21	224	1600	0	0.	0.
22	224	2000	0	0.	0.	22	224	1800	0	0.	0.
23	224	2200	0	0.	0.	23	224	2000	0	0.	0.
24	224	2400	0	0.	0.	24	224	2200	0	0.	0.
25	225	200	0	0.	0.	25	225	2400	0	0.	0.
26	225	400	0	0.	0.	26	225	200	0	0.	0.
27	225	600	0	0.	0.	27	225	400	0	0.	0.
28	225	800	0	0.	0.	28	225	600	0	0.	0.
29	225	1000	0	0.	0.	29	225	800	0	0.	0.
30	225	1200	0	0.	0.	30	225	1000	0	0.	0.
31	225	1400	0	0.	0.	31	225	1200	0	0.	0.
32	225	1600	0	0.	0.	32	225	1400	0	0.	0.
33	225	1800	0	0.	0.	33	225	1600	0	0.	0.
34	225	2000	0	0.	0.	34	225	1800	0	0.	0.
35	225	2200	0	0.	0.	35	225	2000	0	0.	0.
36	225	2400	0	0.	0.	36	225	2200	0	0.	0.
37	226	200	0	0.	0.	37	226	200	0	0.	0.
38	226	400	0	0.	0.	38	226	400	0	0.	0.
39	226	600	0	0.	0.	39	226	600	0	0.	0.
40	226	800	0	0.	0.	40	226	800	0	0.	0.
41	226	1000	0	0.	0.	41	226	1000	0	0.	0.
42	226	1200	0	0.	0.	42	226	1200	0	0.	0.
43	226	1400	0	0.	0.	43	226	1400	0	0.	0.
44	226	1600	0	0.	0.	44	226	1600	0	0.	0.

(Continued)

(Sheet 1 of 12)

Table 3 (Continued)

RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)	RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)
45	226	1501C	10	227.556	0.216	45	226	1801	0	3.914	1.279
46	226	2010	0	4.055	0.100	46	226	2101	0	3.814	1.150
47	226	2100	0	227.556	0.094	47	226	2200	6	4.055	1.194
48	226	2400	0	4.055	0.072	48	226	2400	7	4.144	1.051
49	227	2100	0	227.556	0.061	49	227	2100	0	4.144	0.610
50	227	4101	0	227.556	0.071	50	227	4101	4	3.814	2.711
51	227	6000	0	227.556	0.094	51	227	6000	5	3.731	0.567
52	227	8000	0	227.931	0.037	52	227	8000	0	4.144	2.647
53	227	10000	0	227.556	0.089	53	227	10000	9	3.814	0.288
54	227	12000	0	227.556	0.071	54	227	12000	10	3.03	0.168
55	227	14000	0	227.556	0.077	55	227	14000	0	227.556	0.145
56	227	16000	0	227.556	0.040	56	227	16000	12	3.701	2.817
57	227	18010	0	227.556	0.074	57	227	18010	14	1.911	0.221
58	227	20000	0	227.556	0.256	58	227	20000	0	3.703	0.221
59	227	22000	0	227.556	0.109	59	227	22000	10	227.556	0.207
60	227	24000	0	227.556	0.116	60	227	24000	9	227.556	0.220
61	227	26000	0	227.556	0.102	61	227	26000	0	4.844	3.155
62	228	4000	0	227.556	0.391	62	228	4000	10	227.556	0.177
63	228	6000	0	227.556	0.243	63	228	6000	13	4.644	0.239
64	228	8000	0	227.556	0.070	64	228	8000	0	3.703	0.195
65	228	10000	0	227.556	0.137	65	228	10000	14	3.703	0.216
66	228	12000	0	227.556	0.095	66	228	12000	11	0	0
67	228	14000	0	227.556	0.093	67	228	14000	0	227.556	0.154
68	228	16000	0	227.556	0.066	68	228	16000	12	3.703	0.174
69	228	18000	0	227.556	0.080	69	228	18000	25	0	0
70	228	20000	0	227.556	0.240	70	228	20000	2	3.703	0.227
71	228	22000	0	227.556	0.111	71	228	22000	24	0	0
72	228	24000	0	227.556	0.127	72	228	24000	26	0	0
73	229	2000	0	227.556	0.259	73	229	2000	0	227.556	0.410
74	229	4000	0	227.556	0.127	74	229	4000	31	0	0
75	229	6000	0	227.556	0.140	75	229	6000	13	0	0
76	229	8000	0	227.556	0.032	76	229	8000	18	0	0
77	229	10000	0	227.556	0.658	77	229	10000	19	0	0
78	229	12000	0	227.556	0.080	78	229	12000	25	0	0
79	229	14000	0	227.556	0.240	79	229	14000	23	0	0
80	229	16000	0	227.556	0.111	80	229	16000	31	0	0
81	229	18000	0	227.556	0.127	81	229	18000	13	0	0
82	229	20000	0	227.556	0.250	82	229	20000	6	0	0
83	229	22000	0	227.556	0.140	83	229	22000	18	0	0
84	229	24000	0	227.556	0.032	84	229	24000	35	0	0
85	230	2100	0	227.556	0.392	85	230	2100	15	0	0
86	230	4000	0	227.556	0.361	86	230	4000	23	0	0
87	230	6000	0	227.556	0.259	87	230	6000	45	0	0
88	230	8000	0	227.556	0.250	88	230	8000	7	0	0
89	230	10000	0	227.556	0.304	89	230	10000	6	0	0
90	230	12000	0	227.556	0.379	90	230	12000	59	0	0
91	230	14000	0	227.556	0.335	91	230	14000	7	0	0
92	230	16000	0	227.556	0.162	92	230	16000	23	0	0
93	230	18000	0	227.556	0.178	93	230	18000	63	0	0
94	230	20000	0	227.556	0.355	94	230	20000	60	0	0
95	230	22000	0	227.556	0.218	95	230	22000	9	0	0
96	230	24000	0	227.556	0.116	96	230	24000	71	0	0
97	231	2100	0	227.556	0.367	97	231	2100	66	0	0
98	231	4000	0	227.556	0.076	98	231	4000	10	0	0
99	231	6000	0	227.556	0.232	99	231	6000	65	0	0
100	231	8000	0	227.556	0.099	100	231	8000	6	0	0
101	231	10000	0	227.556	0.162	101	231	10000	15	0	0
102	231	12000	0	227.556	0.178	102	231	12000	10	0	0
103	231	14000	0	227.556	0.169	103	231	14000	7	0	0

(Continued)

(Sheet 2 of 12)

Table 3 (Continued)

RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)	RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)
114	231	1601	0	227, 556	0.227	104	1600	1600	1	0.5	0.
115	231	1800	0	227, 556	0.245	105	1800	1800	1	0.5	0.
116	231	2000	0	227, 556	0.129	106	2000	2000	6	0.	0.
117	231	2200	0	227, 556	0.103	107	2200	2200	5	0.	0.
118	231	2400	0	227, 556	0.119	108	2400	2400	5	0.	0.
119	231	2600	0	227, 556	0.114	109	2600	2600	5	0.	0.
120	231	2800	0	227, 556	0.111	110	2800	2800	5	0.	0.
121	232	1600	0	227, 556	0.109	111	1600	1600	1	0.5	0.
122	232	1800	0	227, 556	0.146	112	1800	1800	1	0.5	0.
123	232	2000	0	227, 556	0.048	113	2000	2000	1	0.5	0.
124	232	2200	0	227, 556	0.045	114	2200	2200	1	0.5	0.
125	232	2400	0	227, 556	0.174	115	2400	2400	1	0.5	0.
126	232	2600	0	227, 556	0.108	116	2600	2600	1	0.5	0.
127	232	2800	0	227, 556	0.225	117	2800	2800	1	0.5	0.
128	232	1600	0	227, 556	0.091	118	1600	1600	1	0.5	0.
129	232	1800	0	227, 556	0.097	119	1800	1800	1	0.5	0.
130	232	2000	0	227, 556	0.047	120	2000	2000	1	0.5	0.
131	232	2200	0	227, 556	0.043	121	2200	2200	1	0.5	0.
132	232	2400	0	227, 556	0.047	122	2400	2400	1	0.5	0.
133	232	2600	0	227, 556	0.043	123	2600	2600	1	0.5	0.
134	232	2800	0	227, 556	0.145	124	2800	2800	1	0.5	0.
135	232	1600	0	227, 556	0.090	125	1600	1600	1	0.5	0.
136	232	1800	0	227, 556	0.099	126	1800	1800	1	0.5	0.
137	232	2000	0	227, 556	0.047	127	2000	2000	1	0.5	0.
138	232	2200	0	227, 556	0.043	128	2200	2200	1	0.5	0.
139	232	2400	0	227, 556	0.144	129	2400	2400	1	0.5	0.
140	232	2600	0	227, 556	0.238	130	2600	2600	1	0.5	0.
141	232	2800	0	227, 556	0.247	131	2800	2800	1	0.5	0.
142	233	1600	0	227, 556	0.164	132	1600	1600	1	0.5	0.
143	233	1800	0	227, 556	0.248	133	1800	1800	1	0.5	0.
144	233	2000	0	227, 556	0.120	134	2000	2000	1	0.5	0.
145	233	2200	0	227, 556	0.121	135	2200	2200	1	0.5	0.
146	233	2400	0	227, 556	0.123	136	2400	2400	1	0.5	0.
147	233	2600	0	227, 556	0.089	137	2600	2600	1	0.5	0.
148	233	2800	0	227, 556	0.169	138	2800	2800	1	0.5	0.
149	234	1600	0	227, 556	0.238	139	1600	1600	1	0.5	0.
150	234	1800	0	227, 556	0.247	140	1800	1800	1	0.5	0.
151	234	2000	0	227, 556	0.164	141	2000	2000	1	0.5	0.
152	234	2200	0	227, 556	0.120	142	2200	2200	1	0.5	0.
153	234	2400	0	227, 556	0.121	143	2400	2400	1	0.5	0.
154	234	2600	0	227, 556	0.122	144	2600	2600	1	0.5	0.
155	234	2800	0	227, 556	0.151	145	2800	2800	1	0.5	0.
156	235	1600	0	227, 556	0.331	146	1600	1600	1	0.5	0.
157	235	1800	0	227, 556	0.042	147	1800	1800	1	0.5	0.
158	235	2000	0	227, 556	0.050	148	2000	2000	1	0.5	0.
159	235	2200	0	227, 556	0.110	149	2200	2200	1	0.5	0.
160	235	2400	0	227, 556	0.226	150	2400	2400	1	0.5	0.
161	235	2600	0	227, 556	0.123	151	2600	2600	1	0.5	0.
162	235	2800	0	227, 556	0.153	152	2800	2800	1	0.5	0.
163	236	1600	0	227, 556	0.217	153	1600	1600	1	0.5	0.
164	236	1800	0	227, 556	0.169	154	1800	1800	1	0.5	0.
165	236	2000	0	227, 556	0.511	155	2000	2000	1	0.5	0.
166	236	2200	0	227, 556	0.664	156	2200	2200	1	0.5	0.
167	236	2400	0	227, 556	0.297	157	2400	2400	1	0.5	0.
168	236	2600	0	227, 556	0.390	158	2600	2600	1	0.5	0.
169	236	2800	0	227, 556	0.248	159	2800	2800	1	0.5	0.
170	237	1600	0	227, 556	0.120	160	1600	1600	1	0.5	0.
171	237	1800	0	227, 556	0.121	161	1800	1800	1	0.5	0.
172	237	2000	0	227, 556	0.123	162	2000	2000	1	0.5	0.
173	237	2200	0	227, 556	0.124	163	2200	2200	1	0.5	0.
174	237	2400	0	227, 556	0.125	164	2400	2400	1	0.5	0.
175	237	2600	0	227, 556	0.126	165	2600	2600	1	0.5	0.
176	237	2800	0	227, 556	0.127	166	2800	2800	1	0.5	0.
177	238	1600	0	227, 556	0.152	167	1600	1600	1	0.5	0.
178	238	1800	0	227, 556	0.162	168	1800	1800	1	0.5	0.
179	238	2000	0	227, 556	0.042	169	2000	2000	1	0.5	0.
180	238	2200	0	227, 556	0.050	170	2200	2200	1	0.5	0.
181	238	2400	0	227, 556	0.127	171	2400	2400	1	0.5	0.
182	238	2600	0	227, 556	0.157	172	2600	2600	1	0.5	0.
183	238	2800	0	227, 556	0.126	173	2800	2800	1	0.5	0.
184	239	1600	0	227, 556	0.054	174	1600	1600	1	0.5	0.
185	239	1800	0	227, 556	0.187	175	1800	1800	1	0.5	0.
186	239	2000	0	227, 556	0.127	176	2000	2000	1	0.5	0.
187	239	2200	0	227, 556	0.157	177	2200	2200	1	0.5	0.
188	239	2400	0	227, 556	0.126	178	2400	2400	1	0.5	0.
189	239	2600	0	227, 556	0.157	179	2600	2600	1	0.5	0.
190	239	2800	0	227, 556	0.125	180	2800	2800	1	0.5	0.
191	240	1600	0	227, 556	0.054	181	1600	1600	1	0.5	0.
192	240	1800	0	227, 556	0.187	182	1800	1800	1	0.5	0.
193	240	2000	0	227, 556	0.127	183	2000	2000	1	0.5	0.
194	240	2200	0	227, 556	0.157	184	2200	2200	1	0.5	0.
195	240	2400	0	227, 556	0.126	185	2400	2400	1	0.5	0.
196	240	2600	0	227, 556	0.157	186	2600	2600	1	0.5	0.
197	240	2800	0	227, 556	0.125	187	2800	2800	1	0.5	0.
198	241	1600	0	227, 556	0.054	188	1600	1600	1	0.5	0.
199	241	1800	0	227, 556	0.187	189	1800	1800	1	0.5	0.
200	241	2000	0	227, 556	0.127	190	2000	2000	1	0.5	0.
201	241	2200	0	227, 556	0.157	191	2200	2200	1	0.5	0.
202	241	2400	0	227, 556	0.126	192	2400	2400	1	0.5	0.
203	241	2600	0	227, 556	0.157	193	2600	2600	1	0.5	0.
204	241	2800	0	227, 556	0.125	194	2800	2800	1	0.5	0.
205	242	1600	0	227, 556	0.054	195	1600	1600	1	0.5	0.
206	242	1800	0	227, 556	0.187	196	1800	1800	1	0.5	0.
207	242	2000	0	227, 556	0.127	197	2000	2000	1	0.5	0.
208	242	2200	0	227, 556	0.157	198	2200	2200	1	0.5	0.
209	242	2400	0	227, 556	0.126	199	2400	2400	1	0.5	0.
210	242	2600	0	227, 556	0.157	200	2600	2600	1	0.5	0.
211	242	2800	0	227, 556	0.125	201	2800	2800	1	0.5	0.
212	243	1600	0	227, 556	0.054	202	1600	1600	1	0.5	0.
213	243	1800	0	227, 556	0.187	203	1800	1800	1	0.5	0.
214	243	2000	0	227, 556	0.127	204	2000	2000	1	0.5	0.
215	243	2200	0	227, 556	0.157	205	2200	2200	1	0.5	0.
216	243	2400	0	227, 556	0.126	206	2400	2400	1	0.5	0.
217	243	2600	0	227, 556	0.157	207	2600	2600	1	0.5	0.
218	243	28									

Table 3 (Continued)

RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)	RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)
153	236	167.0	0	227.554	0.186	163	236	1400	0	3.003	1.271
154	236	1630	0	227.554	0.071	164	236	1600	8	227.554	0.271
155	236	1700	0	227.554	0.099	165	236	1500	4	1.91	0.221
156	236	2010	0	227.556	0.089	166	216	2000	0	5.007	0.171
157	236	2200	0	227.554	0.079	167	236	2200	0	227.554	0.221
158	236	2400	0	227.554	0.169	168	236	2400	0	227.554	0.176
159	237	200	0	227.554	0.144	169	2410	200	0	227.554	0.162
170	237	400	0	227.554	0.104	170	237	200	0	227.554	0.198
171	237	800	0	227.556	0.124	171	237	400	0	227.556	0.227
172	237	1200	0	227.556	0.067	172	237	600	0	227.556	0.221
173	237	1600	0	227.554	0.156	173	237	800	0	227.556	0.192
174	237	1800	0	227.556	0.043	174	237	1000	0	227.556	1.204
175	237	2100	0	227.556	0.091	175	237	1200	0	227.554	1.204
176	237	1600	0	227.554	0.133	176	237	1400	0	227.554	0.185
177	237	1800	0	227.554	0.186	177	237	1600	0	227.554	0.213
178	237	2000	0	227.553	0.096	178	237	1800	0	227.553	0.220
179	237	2200	0	227.556	0.225	179	237	2000	0	227.556	0.227
180	237	2400	0	227.556	0.144	180	237	2200	0	227.556	0.221
181	238	200	0	227.556	0.144	181	238	2400	0	227.556	0.217
182	238	400	0	227.556	0.129	182	238	200	0	227.556	0.217
183	238	800	0	227.556	0.136	183	238	400	0	227.556	0.217
184	238	1200	0	227.556	0.082	184	238	200	0	227.556	0.217
185	238	1600	0	227.554	0.089	185	238	400	0	227.556	0.217
186	238	2000	0	227.556	0.094	186	238	200	0	227.556	0.217
187	238	2400	0	227.556	0.283	187	238	2200	0	227.556	0.217
188	238	1600	0	227.556	0.151	188	238	1400	0	227.556	0.217
189	238	1800	0	227.556	0.129	189	238	1600	0	227.556	0.217
190	238	2000	0	227.556	0.140	190	238	1800	0	227.556	0.217
191	238	2200	0	227.556	0.178	191	238	2000	0	227.556	0.217
192	238	2400	0	227.556	0.054	192	238	2200	0	227.556	0.217
193	238	1600	0	227.555	0.073	193	238	1400	0	227.555	0.217
194	239	200	0	227.556	0.120	194	239	200	0	227.556	0.217
195	239	400	0	227.556	0.074	195	239	200	0	227.556	0.217
196	239	800	0	227.556	0.110	196	239	400	0	227.556	0.217
197	239	1200	0	227.556	0.174	197	239	200	0	227.556	0.217
198	239	1600	0	227.556	0.072	198	239	1400	0	227.556	0.217
199	239	2000	0	227.556	0.125	199	239	1600	0	227.556	0.217
200	239	2200	0	227.556	0.125	200	239	2000	0	227.556	0.217
201	239	2400	0	227.556	0.125	201	239	2200	0	227.556	0.217
202	239	1600	0	227.556	0.147	202	239	1400	0	227.556	0.217
203	239	1800	0	227.556	0.122	203	239	1600	0	227.556	0.217
204	239	2000	0	227.556	0.122	204	239	1800	0	227.556	0.217
205	239	2200	0	227.556	0.122	205	239	2000	0	227.556	0.217
206	239	2400	0	227.556	0.122	206	239	2200	0	227.556	0.217
207	239	1600	0	227.556	0.064	207	240	1600	0	227.556	0.217
208	239	1800	0	227.556	0.064	208	240	1600	0	227.556	0.217
209	239	2000	0	227.556	0.071	209	240	1600	0	227.556	0.217
210	239	2200	0	227.556	0.087	210	240	1600	0	227.556	0.217
211	239	2400	0	227.556	0.084	211	240	1600	0	227.556	0.217
212	240	1600	0	227.556	0.139	212	240	1400	0	227.556	0.217
213	240	1800	0	227.556	0.115	213	240	1200	0	227.556	0.217
214	240	2000	0	227.556	0.125	214	240	1000	0	227.556	0.217
215	240	2200	0	227.556	0.200	215	240	800	0	227.556	0.217
216	240	2400	0	227.556	0.031	216	240	600	0	227.556	0.217
217	240	1600	0	227.556	0.087	217	240	400	0	227.556	0.217
218	240	1800	0	227.556	0.064	218	240	200	0	227.556	0.217
219	241	600	0	227.556	0.139	219	241	400	0	227.556	0.217
220	241	800	0	227.556	0.233	220	241	600	0	227.556	0.217
221	241	1000	0	227.556	0.199	221	241	800	0	227.556	0.217
				0.047		221	241	1000	0	227.556	0.217

(Continued)

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Table 3 (Continued)

RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)	RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)
222	241	12.1	1	227.556	0.114	222	241	12.0	2	7.	0.
223	241	14.0	0	227.555	0.125	223	241	14.0	16	7.	0.
224	241	16.0	0	227.556	0.125	224	241	16.0	56	7.	0.
225	241	18.0	0	227.556	0.128	225	241	18.0	56	7.	0.
226	241	20.0	0	227.554	0.291	226	241	20.0	35	7.	0.
227	241	20.1	1	227.554	0.162	227	241	20.0	9	7.	0.
228	241	24.0	0	227.555	0.131	228	241	24.0	1	7.	0.
229	241	26.2	0	227.556	0.155	229	241	24.0	1	7.	0.
230	241	40.0	0	227.556	0.242	230	241	24.0	1	7.	0.
231	242	6.0	0	227.554	0.445	231	242	4.0	5	0.	0.
232	242	8.0	1	227.551	0.510	232	242	6.0	0	7.	0.
233	242	10.0	0	227.554	0.312	233	242	8.0	1	7.	0.
234	242	12.0	0	227.554	0.265	234	242	10.0	1	7.	0.
235	242	14.0	0	227.556	0.154	235	242	12.0	0	7.	0.
236	242	16.0	0	227.556	0.169	236	242	14.0	7	7.	0.
237	242	18.0	0	227.556	0.119	237	242	16.0	1	7.	0.
238	242	20.0	0	227.555	0.255	238	242	18.0	0	7.	0.
239	242	22.0	0	227.556	0.105	239	242	20.0	0	7.	0.
240	242	24.0	0	227.556	0.127	240	242	22.0	7	7.	0.
241	243	20.0	0	227.556	0.186	241	243	20.0	0	7.	0.
242	243	40.0	0	227.556	0.112	242	243	20.0	7	7.	0.
243	243	60.0	0	227.559	0.020	243	243	20.0	0	7.	0.
244	243	80.0	0	227.556	0.198	244	243	20.0	1	7.	0.
245	243	10.0	0	227.556	0.255	245	243	20.0	0	7.	0.
246	243	22.0	0	227.556	0.105	246	243	20.0	0	7.	0.
247	243	24.0	0	227.556	0.057	247	243	20.0	13	7.	0.
248	243	26.0	0	227.556	0.084	248	243	20.0	8	7.	0.
249	243	28.0	0	227.556	0.086	249	243	20.0	0	7.	0.
250	243	29.0	0	227.556	0.021	250	243	20.0	8	7.	0.
251	243	29.0	0	227.556	0.058	251	243	20.0	6	7.	0.
252	243	29.0	0	227.553	0.134	252	243	20.0	0	7.	0.
253	243	29.0	0	227.553	0.104	253	243	20.0	1	7.	0.
254	243	29.0	0	227.556	0.057	254	243	20.0	0	7.	0.
255	243	29.0	0	227.556	0.102	255	243	20.0	0	7.	0.
256	243	29.0	0	227.556	0.093	256	243	20.0	0	7.	0.
257	244	20.0	0	227.556	0.065	257	243	20.0	0	7.	0.
258	244	20.0	0	227.556	0.104	258	243	20.0	0	7.	0.
259	244	20.0	0	227.556	0.033	259	243	20.0	1	7.	0.
260	244	24.0	0	227.556	0.104	260	243	20.0	0	7.	0.
261	244	26.0	0	227.556	0.089	261	243	20.0	0	7.	0.
262	244	28.0	0	227.556	0.051	262	243	20.0	0	7.	0.
263	244	29.0	0	227.556	0.021	263	243	20.0	0	7.	0.
264	244	29.0	0	227.556	0.049	264	243	20.0	0	7.	0.
265	244	29.0	0	227.556	0.101	265	243	20.0	0	7.	0.
266	244	29.0	0	227.556	0.056	266	243	20.0	0	7.	0.
267	244	29.0	0	227.556	0.035	267	243	20.0	0	7.	0.
268	244	29.0	0	227.556	0.074	268	243	20.0	0	7.	0.
269	244	29.0	0	227.556	0.180	269	243	20.0	0	7.	0.
270	244	29.0	0	227.556	0.102	270	243	20.0	0	7.	0.
271	244	29.0	0	227.556	0.093	271	243	20.0	0	7.	0.
272	244	29.0	0	227.556	0.104	272	243	20.0	0	7.	0.
273	244	29.0	0	227.556	0.035	273	243	20.0	0	7.	0.
274	244	29.0	0	227.556	0.162	274	243	20.0	0	7.	0.
275	244	29.0	0	227.556	0.104	275	243	20.0	0	7.	0.
276	244	29.0	0	227.556	0.083	276	243	20.0	0	7.	0.
277	244	29.0	0	227.556	0.051	277	243	20.0	0	7.	0.
278	244	29.0	0	227.556	0.036	278	243	20.0	0	7.	0.
279	244	29.0	0	227.556	0.026	279	243	20.0	0	7.	0.
280	244	29.0	0	227.556	0.102	280	243	20.0	0	7.	0.
281	244	29.0	0	227.556	0.094	281	243	20.0	0	7.	0.
282	244	29.0	0	227.556	0.087	282	243	20.0	0	7.	0.
283	244	29.0	0	227.556	0.056	283	243	20.0	0	7.	0.
284	244	29.0	0	227.556	0.026	284	243	20.0	0	7.	0.
285	244	29.0	0	227.556	0.026	285	243	20.0	0	7.	0.
286	244	29.0	0	227.556	0.108	286	243	20.0	0	7.	0.
287	244	29.0	0	227.556	0.094	287	243	20.0	0	7.	0.
288	244	29.0	0	227.556	0.087	288	243	20.0	0	7.	0.
289	244	29.0	0	227.556	0.056	289	243	20.0	0	7.	0.
290	244	29.0	0	227.556	0.026	290	243	20.0	0	7.	0.
291	244	29.0	0	227.556	0.026	291	243	20.0	0	7.	0.
292	244	29.0	0	227.556	0.108	292	243	20.0	0	7.	0.
293	244	29.0	0	227.556	0.094	293	243	20.0	0	7.	0.
294	244	29.0	0	227.556	0.087	294	243	20.0	0	7.	0.
295	244	29.0	0	227.556	0.056	295	243	20.0	0	7.	0.
296	244	29.0	0	227.556	0.026	296	243	20.0	0	7.	0.
297	244	29.0	0	227.556	0.026	297	243	20.0	0	7.	0.
298	244	29.0	0	227.556	0.108	298	243	20.0	0	7.	0.
299	244	29.0	0	227.556	0.094	299	243	20.0	0	7.	0.
300	244	29.0	0	227.556	0.087	300	243	20.0	0	7.	0.
301	244	29.0	0	227.556	0.056	301	243	20.0	0	7.	0.
302	244	29.0	0	227.556	0.026	302	243	20.0	0	7.	0.
303	244	29.0	0	227.556	0.026	303	243	20.0	0	7.	0.
304	244	29.0	0	227.556	0.108	304	243	20.0	0	7.	0.
305	244	29.0	0	227.556	0.094	305	243	20.0	0	7.	0.
306	244	29.0	0	227.556	0.087	306	243	20.0	0	7.	0.
307	244	29.0	0	227.556	0.056	307	243	20.0	0	7.	0.
308	244	29.0	0	227.556	0.026	308	243	20.0	0	7.	0.
309	244	29.0	0	227.556	0.026	309	243	20.0	0	7.	0.
310	244	29.0	0	227.556	0.108	310	243	20.0	0	7.	0.
311	244	29.0	0	227.556	0.094	311	243	20.0	0	7.	0.
312	244	29.0	0	227.556	0.087	312	243	20.0	0	7.	0.
313	244	29.0	0	227.556	0.056	313	243	20.0	0	7.	0.
314	244	29.0	0	227.556	0.026	314	243	20.0	0	7.	0.
315	244	29.0	0	227.556	0.026	315	243	20.0	0	7.	0.
316	244	29.0	0	227.556	0.108	316	243	20.0	0	7.	0.
317	244	29.0	0	227.556	0.094	317	243	20.0	0	7.	0.
318	244	29.0	0	227.556	0.087	318	243	20.0	0	7.	0.
319	244	29.0	0	227.556	0.056	319	243	20.0	0	7.	0.
320	244	29.0	0	227.556	0.026	320	243	20.0	0	7.	0.

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(Continued)

Table 3 (Continued)

RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)	RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)
241	26.5	1.000	0	227.556	0.118	241	26.6	1.000	246	1.000	25
237	26.5	1.201	0	227.556	0.109	242	26.6	1.200	56	0	0
243	26.5	1.400	0	227.556	0.085	243	26.6	1.400	20	0	0
244	26.5	1.600	0	227.556	0.121	244	26.6	1.600	12	0	0
235	24.5	1.800	0	227.556	0.104	245	24.6	1.800	5	0	0
245	24.5	2.000	0	227.556	0.055	246	24.6	2.000	18	0	0
247	24.5	2.201	0	227.556	0.106	247	24.6	2.200	14	0	0
246	24.5	2.400	0	227.556	0.158	248	24.6	2.400	2200	0	0
235	24.6	2.600	0	227.556	0.192	249	24.6	2.600	0	0	0
249	24.7	2.800	0	227.556	0.183	250	24.7	2.800	0	0	0
220	22.7	4.000	0	227.556	0.128	250	24.7	4.000	0	0	0
221	22.7	6.000	0	227.556	0.231	251	24.7	6.000	16	0	0
222	22.7	8.000	0	227.556	0.167	252	24.7	8.000	43	0	0
223	24.7	1.500	0	4.055	0.152	252	24.7	8.000	40	0	0
224	24.7	1.700	0	4.441	0.152	253	24.7	1.700	17	0	0
224	24.7	1.900	0	4.755	0.196	254	24.7	1.900	0	0	0
225	24.7	2.100	0	4.819	0.128	255	24.7	2.100	0	0	0
296	24.7	2.300	0	4.664	0.228	256	24.7	2.300	0	0	0
227	24.7	2.600	0	4.819	0.208	257	24.7	2.600	0	0	0
228	24.7	2.800	0	4.819	0.237	258	24.7	2.800	0	0	0
229	24.7	3.000	0	5.017	0.189	259	24.7	3.000	42	0	0
230	24.7	3.200	0	5.211	0.161	260	24.7	3.200	2200	0	0
321	24.8	2.000	0	5.007	0.135	261	24.8	2.000	2400	0	0
322	24.8	4.000	0	4.819	0.128	301	24.8	2.000	200	0	0
323	24.8	6.000	0	4.655	0.159	302	24.8	4.000	400	0	0
324	24.8	8.000	0	227.556	0.274	303	24.8	6.000	600	0	0
325	24.8	10.000	0	5.007	0.247	304	24.8	8.000	800	0	0
315	24.9	1.000	0	227.556	0.354	305	24.8	10.000	1000	0	0
316	24.9	1.200	0	5.007	0.211	306	24.8	12.000	1200	0	0
317	24.9	1.400	0	227.556	0.241	307	24.8	14.000	1400	0	0
328	24.9	1.600	0	4.055	0.220	308	24.8	16.000	1600	0	0
319	24.9	1.800	0	4.664	0.179	309	24.8	18.000	1800	0	0
310	24.9	2.000	0	227.556	0.274	310	24.8	20.000	2000	0	0
311	24.9	2.200	0	227.556	0.203	311	24.8	22.000	2200	0	0
312	24.9	2.400	0	227.556	0.292	312	24.8	24.000	2400	0	0
313	24.9	2.600	0	227.556	0.261	313	24.8	26.000	2600	0	0
314	24.9	2.800	0	227.556	0.115	314	24.8	28.000	2800	0	0
315	24.9	3.000	0	227.556	0.220	315	24.8	30.000	3000	0	0
316	24.9	3.200	0	227.556	0.232	316	24.8	32.000	3200	0	0
317	24.9	3.400	0	227.556	0.233	317	24.8	34.000	3400	0	0
318	24.9	3.600	0	227.556	0.234	318	24.8	36.000	3600	0	0
319	24.9	3.800	0	227.556	0.235	319	24.8	38.000	3800	0	0
320	24.9	4.000	0	227.556	0.236	320	24.8	40.000	4000	0	0
321	24.9	4.200	0	227.556	0.237	321	24.8	42.000	4200	0	0
322	24.9	4.400	0	227.556	0.238	322	24.8	44.000	4400	0	0
323	24.9	4.600	0	227.556	0.239	323	24.8	46.000	4600	0	0
324	24.9	4.800	0	227.556	0.240	324	24.8	48.000	4800	0	0
325	24.9	5.000	0	227.556	0.241	325	24.8	50.000	5000	0	0
326	24.9	5.200	0	227.556	0.242	326	24.8	52.000	5200	0	0
327	24.9	5.400	0	227.556	0.243	327	24.8	54.000	5400	0	0
328	24.9	5.600	0	227.556	0.244	328	24.8	56.000	5600	0	0
329	24.9	5.800	0	227.556	0.245	329	24.8	58.000	5800	0	0
330	24.9	6.000	0	227.556	0.246	330	24.8	60.000	6000	0	0
331	24.9	6.200	0	227.556	0.247	331	24.8	62.000	6200	0	0
332	24.9	6.400	0	227.556	0.248	332	24.8	64.000	6400	0	0
333	24.9	6.600	0	227.556	0.249	333	24.8	66.000	6600	0	0
334	24.9	6.800	0	227.556	0.250	334	24.8	68.000	6800	0	0
335	24.9	7.000	0	227.556	0.251	335	24.8	70.000	7000	0	0
336	24.9	7.200	0	227.556	0.252	336	24.8	72.000	7200	0	0
337	24.9	7.400	0	227.556	0.253	337	24.8	74.000	7400	0	0
338	24.9	7.600	0	227.556	0.254	338	24.8	76.000	7600	0	0
339	24.9	7.800	0	227.556	0.255	339	24.8	78.000	7800	0	0

(Continued)

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Table 3 (Continued)

RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)	RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)
35.1	251	1.061	0	227.554	1.073	35.2	251	1.071	0	227.556	1.073
35.2	251	1.213	0	227.555	0.079	35.3	251	1.213	0	227.554	0.079
35.3	251	1.465	0	227.554	0.123	35.4	251	1.465	0	227.554	0.123
35.4	251	1.617	0	227.554	0.164	35.5	251	1.617	0	227.554	0.164
35.5	251	1.769	0	227.554	0.229	35.6	251	1.769	0	227.554	0.229
35.6	251	1.921	0	227.554	0.284	35.7	251	1.921	0	227.554	0.284
35.7	251	2.073	0	227.554	0.349	35.8	251	2.073	0	227.554	0.349
35.8	251	2.225	0	227.554	0.414	35.9	251	2.225	0	227.554	0.414
35.9	251	2.377	0	227.554	0.479	36.0	251	2.377	0	227.554	0.479
36.0	251	2.529	0	227.554	0.544	36.1	251	2.529	0	227.554	0.544
36.1	251	2.681	0	227.554	0.609	36.2	251	2.681	0	227.554	0.609
36.2	251	2.833	0	227.554	0.674	36.3	251	2.833	0	227.554	0.674
36.3	251	2.985	0	227.554	0.739	36.4	251	2.985	0	227.554	0.739
36.4	251	3.137	0	227.554	0.804	36.5	251	3.137	0	227.554	0.804
36.5	251	3.289	0	227.554	0.869	36.6	251	3.289	0	227.554	0.869
36.6	251	3.441	0	227.554	0.934	36.7	251	3.441	0	227.554	0.934
36.7	251	3.593	0	227.554	0.999	36.8	251	3.593	0	227.554	0.999
36.8	251	3.745	0	227.554	1.064	36.9	251	3.745	0	227.554	1.064
36.9	251	3.897	0	227.554	1.129	37.0	251	3.897	0	227.554	1.129
37.0	251	4.049	0	227.554	1.194	37.1	251	4.049	0	227.554	1.194
37.1	251	4.201	0	227.554	1.259	37.2	251	4.201	0	227.554	1.259
37.2	251	4.353	0	227.554	1.324	37.3	251	4.353	0	227.554	1.324
37.3	251	4.505	0	227.554	1.389	37.4	251	4.505	0	227.554	1.389
37.4	251	4.657	0	227.554	1.454	37.5	251	4.657	0	227.554	1.454
37.5	251	4.809	0	227.554	1.519	37.6	251	4.809	0	227.554	1.519
37.6	251	4.961	0	227.554	1.584	37.7	251	4.961	0	227.554	1.584
37.7	251	5.113	0	227.554	1.649	37.8	251	5.113	0	227.554	1.649
37.8	251	5.265	0	227.554	1.714	37.9	251	5.265	0	227.554	1.714
37.9	251	5.417	0	227.554	1.779	38.0	251	5.417	0	227.554	1.779
38.0	251	5.569	0	227.554	1.844	38.1	251	5.569	0	227.554	1.844
38.1	251	5.721	0	227.554	1.909	38.2	251	5.721	0	227.554	1.909
38.2	251	5.873	0	227.554	1.974	38.3	251	5.873	0	227.554	1.974
38.3	251	6.025	0	227.554	2.039	38.4	251	6.025	0	227.554	2.039
38.4	251	6.177	0	227.554	2.104	38.5	251	6.177	0	227.554	2.104
38.5	251	6.329	0	227.554	2.169	38.6	251	6.329	0	227.554	2.169
38.6	251	6.481	0	227.554	2.234	38.7	251	6.481	0	227.554	2.234
38.7	251	6.633	0	227.554	2.299	38.8	251	6.633	0	227.554	2.299
38.8	251	6.785	0	227.554	2.364	38.9	251	6.785	0	227.554	2.364
38.9	251	6.937	0	227.554	2.429	39.0	251	6.937	0	227.554	2.429
39.0	251	7.089	0	227.554	2.494	39.1	251	7.089	0	227.554	2.494
39.1	251	7.241	0	227.554	2.559	39.2	251	7.241	0	227.554	2.559
39.2	251	7.393	0	227.554	2.624	39.3	251	7.393	0	227.554	2.624
39.3	251	7.545	0	227.554	2.689	39.4	251	7.545	0	227.554	2.689
39.4	251	7.697	0	227.554	2.754	39.5	251	7.697	0	227.554	2.754
39.5	251	7.849	0	227.554	2.819	39.6	251	7.849	0	227.554	2.819
39.6	251	8.001	0	227.554	2.884	39.7	251	8.001	0	227.554	2.884
39.7	251	8.153	0	227.554	2.949	39.8	251	8.153	0	227.554	2.949
39.8	251	8.305	0	227.554	3.014	39.9	251	8.305	0	227.554	3.014
39.9	251	8.457	0	227.554	3.079	40.0	251	8.457	0	227.554	3.079
40.0	251	8.609	0	227.554	3.144	40.1	251	8.609	0	227.554	3.144
40.1	251	8.761	0	227.554	3.209	40.2	251	8.761	0	227.554	3.209
40.2	251	8.913	0	227.554	3.274	40.3	251	8.913	0	227.554	3.274
40.3	251	9.065	0	227.554	3.339	40.4	251	9.065	0	227.554	3.339
40.4	251	9.217	0	227.554	3.404	40.5	251	9.217	0	227.554	3.404
40.5	251	9.369	0	227.554	3.469	40.6	251	9.369	0	227.554	3.469
40.6	251	9.521	0	227.554	3.534	40.7	251	9.521	0	227.554	3.534
40.7	251	9.673	0	227.554	3.6	40.8	251	9.673	0	227.554	3.6
40.8	251	9.825	0	227.554	3.665	40.9	251	9.825	0	227.554	3.665
40.9	251	9.977	0	227.554	3.73	41.0	251	9.977	0	227.554	3.73
41.0	251	1.02	0	227.554	3.795	41.1	251	1.02	0	227.554	3.795
41.1	251	1.172	0	227.554	3.86	41.2	251	1.172	0	227.554	3.86
41.2	251	1.324	0	227.554	3.925	41.3	251	1.324	0	227.554	3.925
41.3	251	1.476	0	227.554	3.989	41.4	251	1.476	0	227.554	3.989
41.4	251	1.628	0	227.554	4.054	41.5	251	1.628	0	227.554	4.054
41.5	251	1.78	0	227.554	4.119	41.6	251	1.78	0	227.554	4.119
41.6	251	1.932	0	227.554	4.184	41.7	251	1.932	0	227.554	4.184
41.7	251	2.084	0	227.554	4.249	41.8	251	2.084	0	227.554	4.249
41.8	251	2.236	0	227.554	4.314	41.9	251	2.236	0	227.554	4.314
41.9	251	2.388	0	227.554	4.379	42.0	251	2.388	0	227.554	4.379
42.0	251	2.54	0	227.554	4.444	42.1	251	2.54	0	227.554	4.444
42.1	251	2.692	0	227.554	4.509	42.2	251	2.692	0	227.554	4.509
42.2	251	2.844	0	227.554	4.574	42.3	251	2.844	0	227.554	4.574
42.3	251	2.996	0	227.554	4.639	42.4	251	2.996	0	227.554	4.639
42.4	251	3.148	0	227.554	4.704	42.5	251	3.148	0	227.554	4.704
42.5	251	3.299	0	227.554	4.769	42.6	251	3.299	0	227.554	4.769
42.6	251	3.451	0	227.554	4.834	42.7	251	3.451	0	227.554	4.834
42.7	251	3.593	0	227.554	4.899	42.8	251	3.593	0	227.554	4.899
42.8	251	3.745	0	227.554	4.964	42.9	251	3.745	0	227.554	4.964
42.9	251	3.897	0	227.554	5.029	43.0	251	3.897	0	227.554	5.029
43.0	251	4.049	0	227.554	5.094	43.1	251	4.049	0	227.554	5.094
43.1	251	4.201	0	227.554	5.159	43.2	251	4.201	0	227.554	5.159
43.2	251	4.353	0	227.554	5.224	43.3	251	4.353	0	227.554	5.224
43.3	251	4.505	0	227.554	5.289	43.4	251	4.505	0	227.554	5.289
43.4	251	4.657	0	227.554	5.354	43.5	251	4.657	0	227.554	5.354
43.5	251	4.809	0	227.554	5.419	43.6	251	4.809	0	227.554	5.419
43.6	251	4.961	0	227.554	5.484	43.7	251	4.961	0	227.554	5.484
43.7	251	5.113	0	227.554	5.549	43.8	251	5.113	0	227.554	5.549
43.8	251	5.265	0	227.554	5.614	43.9	251	5.265	0	227.554	5.614
43.9	251	5.417	0	227.554	5.679	44.0	251	5.417	0	227.554	5.679
44.0	251	5.569	0	227.554	5.744	44.1	251	5.569	0	227.554	5.744
44.1	251	5.721	0	227.554	5.809	44.2	251	5.721	0	227.554	5.809
44.2	251	5.873	0	227.554	5.874	44.3	251	5.873	0	227.554	5.874
44.3	251	6.025	0	227.554	5.939	44.4	251	6.025	0	227.554	5.939
44.4	251	6.177	0	227.554	6.004	44.5	251	6.177	0	227.554	6.004
44.5	251	6.329	0	227.554	6.069	44.6					

Table 3 (Continued)

RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HGT. (FT.)	RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HGT. (FT.)
329	255	6:15	0	1.7	1	327	600	2:56	0	1	7
410	255	8:33	0	1.7	1	410	256	4:00	6	0	0
411	256	10:51	0	1.7	1	411	256	10:00	0	0	0
412	256	12:49	0	1.7	1	412	256	12:00	0	0	0
413	256	14:57	0	1.7	1	413	256	14:00	5	4.119	2.574
414	256	16:05	0	1.7	1	414	256	16:00	15	5.771	3.571
415	256	17:13	0	1.7	1	415	256	17:00	15	5.771	3.571
416	256	18:21	0	1.7	1	416	256	18:00	15	4.421	2.774
417	256	19:29	0	1.7	1	417	256	19:00	15	5.991	3.594
418	256	20:37	0	1.7	1	418	256	20:00	0	0	0
419	256	21:45	0	1.7	1	419	256	21:00	0	0	0
420	257	0:53	0	1.7	1	420	257	0:00	0	0	0
421	257	2:01	0	1.7	1	421	257	1:00	0	0	0
422	257	3:09	0	1.7	1	422	257	2:00	11	5.703	3.051
423	257	4:17	0	1.7	1	423	257	3:00	0	0	0
424	257	5:25	0	1.7	1	424	257	4:00	0	0	0
425	257	6:33	0	1.7	1	425	257	5:00	0	0	0
426	257	7:41	0	1.7	1	426	257	6:00	0	0	0
427	257	8:49	0	1.7	1	427	257	7:00	0	0	0
428	257	9:57	0	1.7	1	428	257	8:00	0	0	0
429	257	11:05	0	1.7	1	429	257	9:00	0	0	0
430	257	12:13	0	1.7	1	430	257	10:00	0	0	0
431	257	13:21	0	1.7	1	431	257	11:00	15	5.703	3.051
432	257	14:29	0	1.7	1	432	257	12:00	0	0	0
433	257	15:37	0	1.7	1	433	257	13:00	0	0	0
434	257	16:45	0	1.7	1	434	257	14:00	0	0	0
435	257	17:53	0	1.7	1	435	257	15:00	0	0	0
436	257	18:59	0	1.7	1	436	257	16:00	0	0	0
437	258	0:07	0	1.7	1	437	258	1:00	0	0	0
438	258	1:15	0	1.7	1	438	258	0:00	0	0	0
439	258	2:23	0	1.7	1	439	258	1:00	0	0	0
440	258	3:31	0	1.7	1	440	258	2:00	0	0	0
441	258	4:39	0	1.7	1	441	258	3:00	0	0	0
442	258	5:47	0	1.7	1	442	258	4:00	0	0	0
443	258	6:55	0	1.7	1	443	258	5:00	0	0	0
444	258	7:53	0	1.7	1	444	258	6:00	0	0	0
445	258	8:59	0	1.7	1	445	258	7:00	0	0	0
446	258	9:57	0	1.7	1	446	258	8:00	0	0	0
447	258	10:55	0	1.7	1	447	258	9:00	0	0	0
448	258	11:53	0	1.7	1	448	258	10:00	0	0	0
449	258	12:51	0	1.7	1	449	258	11:00	0	0	0
450	258	13:59	0	1.7	1	450	258	12:00	0	0	0
451	258	14:57	0	1.7	1	451	258	13:00	0	0	0
452	258	15:55	0	1.7	1	452	258	14:00	0	0	0
453	258	16:53	0	1.7	1	453	258	15:00	0	0	0
454	258	17:51	0	1.7	1	454	258	16:00	0	0	0
455	258	18:49	0	1.7	1	455	258	17:00	0	0	0
456	258	19:57	0	1.7	1	456	258	18:00	0	0	0
457	258	20:55	0	1.7	1	457	258	19:00	0	0	0
458	258	21:53	0	1.7	1	458	258	20:00	0	0	0
459	258	22:51	0	1.7	1	459	258	21:00	0	0	0
460	258	23:49	0	1.7	1	460	258	22:00	0	0	0
461	258	0:47	0	1.7	1	461	258	23:00	0	0	0
462	258	1:45	0	1.7	1	462	258	0:00	0	0	0
463	258	2:43	0	1.7	1	463	258	1:00	0	0	0
464	258	3:41	0	1.7	1	464	258	2:00	0	0	0
465	258	4:39	0	1.7	1	465	258	3:00	0	0	0
466	258	5:37	0	1.7	1	466	258	2:00	0	0	0
467	258	6:35	0	1.7	1	467	258	1:00	0	0	0
468	258	7:33	0	1.7	1	468	258	0:00	0	0	0
469	258	8:31	0	1.7	1	469	258	1:00	0	0	0
470	258	9:29	0	1.7	1	470	258	0:00	0	0	0
471	258	10:27	0	1.7	1	471	258	1:00	0	0	0
472	258	11:25	0	1.7	1	472	258	0:00	0	0	0
473	258	12:23	0	1.7	1	473	258	1:00	0	0	0
474	258	13:21	0	1.7	1	474	258	0:00	0	0	0
475	258	14:19	0	1.7	1	475	258	1:00	0	0	0
476	258	15:17	0	1.7	1	476	258	0:00	0	0	0
477	258	16:15	0	1.7	1	477	258	1:00	0	0	0
478	258	17:13	0	1.7	1	478	258	0:00	0	0	0
479	258	18:11	0	1.7	1	479	258	1:00	0	0	0
480	258	19:09	0	1.7	1	480	258	0:00	0	0	0
481	258	20:07	0	1.7	1	481	258	1:00	0	0	0
482	258	21:05	0	1.7	1	482	258	0:00	0	0	0
483	258	21:43	0	1.7	1	483	258	1:00	0	0	0
484	258	22:41	0	1.7	1	484	258	0:00	0	0	0
485	258	23:39	0	1.7	1	485	258	1:00	0	0	0
486	258	0:37	0	1.7	1	486	258	0:00	0	0	0
487	258	1:35	0	1.7	1	487	258	1:00	0	0	0
488	258	2:33	0	1.7	1	488	258	0:00	0	0	0
489	258	3:31	0	1.7	1	489	258	1:00	0	0	0
490	258	4:29	0	1.7	1	490	258	0:00	0	0	0
491	258	5:27	0	1.7	1	491	258	1:00	0	0	0
492	258	6:25	0	1.7	1	492	258	0:00	0	0	0
493	258	7:23	0	1.7	1	493	258	1:00	0	0	0
494	258	8:21	0	1.7	1	494	258	0:00	0	0	0
495	258	9:19	0	1.7	1	495	258	1:00	0	0	0
496	258	10:17	0	1.7	1	496	258	0:00	0	0	0
497	258	11:15	0	1.7	1	497	258	1:00	0	0	0
498	258	12:13	0	1.7	1	498	258	0:00	0	0	0
499	258	13:11	0	1.7	1	499	258	1:00	0	0	0
500	258	14:09	0	1.7	1	500	258	0:00	0	0	0
501	258	15:07	0	1.7	1	501	258	1:00	0	0	0
502	258	16:05	0	1.7	1	502	258	0:00	0	0	0
503	258	17:03	0	1.7	1	503	258	1:00	0	0	0
504	258	17:51	0	1.7	1	504	258	0:00	0	0	0
505	258	18:49	0	1.7	1	505	258	1:00	0	0	0
506	258	19:47	0	1.7	1	506	258	0:00	0	0	0
507	258	20:45	0	1.7	1	507	258	1:00	0	0	0
508	258	21:43	0	1.7	1	508	258	0:00	0	0	0
509	258	22:41	0	1.7	1	509	258	1:00	0	0	0
510	258	23:39	0	1.7	1	510	258	0:00	0	0	0
511	258	0:37	0	1.7	1	511	258	1:00	0	0	0
512	258	1:35	0	1.7	1	512	258	0:00	0	0	0
513	258	2:33	0	1.7	1	513	258	1:00	0	0	0
514	258	3:31	0	1.7	1	514	258	0:00	0	0	0
515	258	4:29	0	1.7	1	515	258	1:00	0	0	0
516	258	5:27	0	1.7	1	516	258	0:00	0	0	0
517	258	6:25	0	1.7	1	517	258	1:00	0	0	0
518	258	7:23	0	1.7	1	518	258	0:00	0	0	0
519	258	8:21	0	1.7	1	519	258	1:00	0	0	0
520	258	9:19	0	1.7	1	520	258	0:00	0	0	0
521	258	10:17	0	1.7	1	521	258	1:00	0	0	0
522	258	11:15	0	1.7	1	522	258	0:00	0	0	0
523	258	12:13	0	1.7	1	523	258	1:00	0	0	0
524	258	13:11									

Table 4 (Continued)

RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)	RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)
517	322	2330	0	227.156	0.067	517	322	2330	0	5.007	0.688
518	323	130	0	227.556	0.112	518	323	130	0	4.419	0.475
519	323	330	0	227.556	0.115	519	323	330	0	227.356	0.546
520	323	330	0	227.556	0.137	520	323	330	0	227.356	0.590
521	323	730	0	227.554	0.085	521	323	730	0	227.356	0.267
522	323	930	0	227.556	0.124	522	323	930	0	227.356	0.277
523	323	1130	0	227.556	0.106	523	323	1130	0	227.356	0.174
524	323	1330	0	227.556	0.109	524	323	1330	0	227.356	0.230
525	323	1530	0	227.556	0.212	525	323	1530	0	227.356	0.315
526	323	1730	0	227.556	0.143	526	323	1730	0	227.356	0.337
527	323	1930	0	227.556	0.167	527	323	1930	0	227.356	0.391
528	323	2130	0	227.556	0.180	528	323	2130	0	227.356	0.289
529	323	2330	0	227.556	0.174	529	323	2330	0	227.356	0.811
530	324	130	0	227.556	0.217	530	324	130	0	0.877	0.877
531	324	330	0	227.556	0.217	531	324	330	0	0.877	0.877
532	324	530	0	227.556	0.194	532	324	530	0	0.873	0.873
533	324	730	0	227.556	0.212	533	324	730	0	0.870	0.870
534	324	930	0	227.556	0.222	534	324	930	0	0.867	0.867
535	324	1130	0	227.556	0.201	535	324	1130	0	0.854	0.854
536	324	1330	0	227.556	0.228	536	324	1330	0	0.825	1.167
537	324	1530	0	227.556	0.113	537	324	1530	0	0.814	1.034
538	324	1730	0	227.556	0.189	538	324	1730	0	0.810	1.646
539	324	1930	0	227.556	0.194	539	324	1930	0	0.810	2.319
540	324	2130	0	227.556	0.147	540	324	2130	0	0.810	2.319
541	324	2330	0	227.556	0.132	541	324	2330	0	0.810	2.319
542	325	130	0	227.556	0.225	542	325	130	0	0.810	2.319
543	325	330	0	227.556	0.228	543	325	330	0	0.810	2.319
544	325	530	0	227.556	0.226	544	325	530	0	0.810	2.319
545	325	730	0	227.556	0.224	545	325	730	0	0.810	2.319
546	325	930	0	227.556	0.224	546	325	930	0	0.810	2.319
547	325	1130	0	227.556	0.224	547	325	1130	0	0.810	2.319
548	325	1330	0	227.556	0.224	548	325	1330	0	0.810	2.319
549	325	1530	0	227.556	0.224	549	325	1530	0	0.810	2.319
550	325	1730	0	227.556	0.224	550	325	1730	0	0.810	2.319
551	325	1930	0	227.556	0.224	551	325	1930	0	0.810	2.319
552	325	2130	0	227.556	0.224	552	325	2130	0	0.810	2.319
553	325	2330	0	227.556	0.224	553	325	2330	0	0.810	2.319
554	326	130	0	227.556	0.113	554	326	130	0	0.810	2.319
555	326	330	0	227.556	0.113	555	326	330	0	0.810	2.319
556	326	530	0	227.556	0.113	556	326	530	0	0.810	2.319
557	326	730	0	227.556	0.114	557	326	730	0	0.810	2.319
558	326	930	0	227.556	0.114	558	326	930	0	0.810	2.319
559	326	1130	0	227.556	0.114	559	326	1130	0	0.810	2.319
560	326	1330	0	227.556	0.114	560	326	1330	0	0.810	2.319
561	326	1530	0	227.556	0.114	561	326	1530	0	0.810	2.319
562	326	1730	0	227.556	0.114	562	326	1730	0	0.810	2.319
563	326	1930	0	227.556	0.114	563	326	1930	0	0.810	2.319
564	326	2130	0	227.556	0.114	564	326	2130	0	0.810	2.319
565	326	2330	0	227.556	0.114	565	326	2330	0	0.810	2.319
566	327	130	0	227.556	0.114	566	327	130	0	0.810	2.319
567	327	330	0	227.556	0.114	567	327	330	0	0.810	2.319
568	327	530	0	227.556	0.114	568	327	530	0	0.810	2.319
569	327	730	0	227.556	0.114	569	327	730	0	0.810	2.319
570	327	930	0	227.556	0.114	570	327	930	0	0.810	2.319
571	327	1130	0	227.556	0.114	571	327	1130	0	0.810	2.319
572	327	1330	0	227.556	0.114	572	327	1330	0	0.810	2.319
573	327	1530	0	227.556	0.114	573	327	1530	0	0.810	2.319
574	327	1730	0	227.556	0.114	574	327	1730	0	0.810	2.319
575	327	1930	0	227.556	0.114	575	327	1930	0	0.810	2.319

(Continued)

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Table 4 (Continued)

RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. MT. (FT.)	RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. MT. (FT.)
458	318	110	1	5.007	0.251	658	318	130	0	5.007	1.087
459	318	310	0	227.556	0.284	659	318	330	0	5.007	1.087
460	318	530	1	4.119	0.265	660	318	530	0	5.211	1.047
461	318	730	0	4.188	0.298	661	318	730	0	5.473	2.448
462	318	910	0	227.556	0.259	662	318	930	0	5.936	2.016
463	318	110	0	227.556	0.212	663	318	1130	0	5.225	1.753
464	318	1310	0	227.556	0.254	664	318	1330	1	5.936	1.044
465	318	1510	0	227.556	0.180	665	318	1530	0	5.225	1.067
466	318	1730	0	227.556	0.184	666	318	1730	0	5.673	1.086
467	318	1930	0	227.556	0.264	667	318	1930	0	6.225	1.009
468	318	2130	0	227.556	0.174	668	318	2130	0	6.543	1.377
469	318	2310	0	227.556	0.151	669	318	2330	0	6.225	1.639
470	319	110	0	227.556	0.147	670	319	130	0	6.543	1.008
471	319	310	0	227.556	0.164	671	319	330	0	6.312	1.332
472	319	530	0	227.556	0.115	672	319	530	0	6.543	1.420
473	319	730	0	227.556	0.091	673	319	730	0	6.936	1.000
474	319	910	0	227.556	0.098	674	319	930	0	5.671	1.000
475	319	110	0	227.556	0.172	675	319	1130	0	6.225	1.009
476	319	1310	0	227.556	0.129	676	319	1330	0	6.543	1.377
477	319	1510	0	227.556	0.143	677	319	1530	0	6.225	1.008
478	319	1730	0	227.556	0.061	678	319	1730	0	6.543	1.054
479	319	1930	0	227.556	0.027	679	319	1930	0	6.936	1.064
480	319	2130	0	227.556	0.175	680	319	2130	0	5.931	0.000
481	319	2310	0	227.556	0.098	681	319	2330	0	6.481	0.000
482	319	2510	0	227.556	0.099	682	319	2530	0	6.279	0.000
483	320	110	0	227.556	0.129	683	319	1130	0	5.417	0.001
484	320	310	0	227.556	0.143	684	319	1330	0	5.211	0.000
485	320	530	0	227.556	0.061	685	319	1530	0	6.225	0.000
486	320	730	0	227.556	0.027	686	319	1730	0	6.543	0.000
487	320	910	0	227.556	0.201	687	319	1930	0	5.931	0.000
488	320	1130	0	227.556	0.201	688	319	2130	0	6.481	0.000
489	320	1310	0	227.556	0.167	689	319	2310	0	6.279	0.000
490	320	1510	0	227.556	0.195	690	319	2510	0	6.225	0.000
491	320	1730	0	227.556	0.063	691	320	1730	0	6.543	0.000
492	320	1930	0	227.556	0.113	692	320	1930	0	6.225	0.000
493	320	2130	0	227.556	0.119	693	320	2130	0	6.543	0.000
494	320	2310	0	227.556	0.223	694	320	2330	0	6.225	0.000
495	321	130	0	227.556	0.167	695	321	1330	0	6.225	0.000
496	321	310	0	227.556	0.195	696	321	1530	0	6.225	0.000
497	321	530	0	227.556	0.216	697	321	1730	0	6.543	0.000
498	321	730	0	227.556	0.208	698	321	1930	0	6.225	0.000
499	321	910	0	227.556	0.122	699	321	2130	0	6.543	0.000
500	321	110	0	227.556	0.118	700	321	2330	0	6.225	0.000
501	321	1310	0	227.556	0.083	701	321	2530	0	6.543	0.000
502	321	1510	0	227.556	0.167	702	321	1130	0	6.225	0.000
503	321	1730	0	227.556	0.084	703	321	1330	0	6.225	0.000
504	321	1930	0	227.556	0.192	704	321	2130	0	6.543	0.000
505	321	2130	0	227.556	0.105	705	321	2330	0	6.225	0.000
506	321	2310	0	227.556	0.122	706	321	2530	0	6.543	0.000
507	321	2510	0	227.556	0.141	707	321	1110	0	6.225	0.000
508	321	2710	0	227.556	0.115	708	321	1310	0	6.225	0.000
509	321	2910	0	227.556	0.217	709	321	1510	0	6.543	0.000
510	321	310	0	227.556	0.264	710	321	1710	0	6.225	0.000
511	321	530	0	227.556	0.194	711	321	1910	0	6.543	0.000
512	321	730	0	227.556	0.113	712	321	2110	0	6.225	0.000
513	321	910	0	227.556	0.188	713	321	2310	0	6.543	0.000
514	321	110	0	227.556	0.137	714	321	2510	0	6.225	0.000
515	321	1310	0	227.556	0.109	715	321	1110	0	6.225	0.000
516	321	1510	0	227.556	0.141	716	321	1310	0	6.543	0.000

(Continued)

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Table 4 (Continued)

RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)	RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)
399	313	2130	0	227.356	0.123	399	313	2130	0	4.350	0.714
400	313	2130	0	227.356	0.111	400	313	2130	0	4.350	0.589
401	313	2130	0	227.356	0.233	401	313	2130	0	4.350	0.446
402	313	2130	0	227.356	0.068	402	313	2130	0	4.350	0.438
403	313	2130	0	227.356	0.085	403	313	2130	0	227.356	0.618
404	313	2130	0	227.356	0.165	404	313	2130	0	4.350	0.733
405	313	2130	0	227.356	0.161	405	313	2130	0	4.350	0.188
406	313	2130	0	227.356	0.159	406	313	2130	0	4.350	0.646
407	313	2130	0	227.356	0.224	407	313	2130	0	4.350	1.161
408	313	2130	0	227.356	0.269	408	313	2130	0	4.350	1.031
409	313	2130	0	4.819	0.114	409	313	2130	0	4.350	1.034
410	314	2130	0	227.356	0.131	410	314	2130	0	4.350	0.910
411	314	2130	0	227.356	0.072	411	314	2130	0	4.350	0.710
412	314	2130	0	4.817	0.166	412	314	2130	0	227.356	1.533
413	314	2130	0	227.356	0.143	413	314	2130	0	6.543	2.502
414	314	2130	0	227.356	0.150	414	314	2130	0	8.225	2.405
415	314	2130	0	227.356	0.199	415	314	2130	0	8.225	1.748
416	314	2130	0	227.356	0.166	416	314	2130	0	8.225	1.884
417	314	2130	0	227.356	0.215	417	314	2130	0	8.225	1.700
418	314	2130	0	227.356	0.187	418	314	2130	0	8.225	1.702
419	314	2130	0	227.356	0.171	419	314	2130	0	9.790	2.038
420	314	2130	0	227.356	0.122	420	314	2130	0	8.790	1.886
421	314	2130	0	227.356	0.169	421	314	2130	0	8.790	1.639
422	315	1530	0	227.356	0.152	422	315	1530	0	8.225	1.750
423	315	1530	0	227.356	0.151	423	315	1530	0	8.225	1.712
424	315	1530	0	227.356	0.175	424	315	1530	0	8.225	1.740
425	315	2130	0	4.388	0.186	425	315	1530	0	8.225	1.946
426	315	2130	0	227.356	0.366	426	315	1530	0	8.225	2.431
427	315	2130	0	227.356	0.231	427	315	1530	0	8.225	2.429
428	315	2130	0	227.356	0.265	428	315	1530	0	8.225	2.252
429	315	2130	0	227.356	0.152	429	315	1530	0	8.225	2.196
430	315	2130	0	227.356	0.151	430	315	1530	0	8.225	2.171
431	315	2130	0	227.356	0.259	431	315	1530	0	8.225	2.614
432	315	2130	0	227.356	0.262	432	315	1530	0	8.225	2.637
433	315	2130	0	227.356	0.192	433	315	2130	0	8.225	2.625
434	315	2130	0	4.664	0.181	434	315	2130	0	8.225	2.593
435	315	2130	0	227.356	0.129	435	315	2130	0	8.225	2.515
436	316	2130	0	227.356	0.132	436	316	2130	0	7.728	1.319
437	316	2130	0	5.007	0.120	437	316	2130	0	6.896	1.043
438	316	2130	0	4.388	0.219	438	316	2130	0	6.896	1.000
439	316	2130	0	227.356	0.142	439	316	2130	0	227.356	0.844
440	316	2130	0	227.356	0.181	440	316	2130	0	227.356	0.914
441	316	2130	0	227.356	0.192	441	316	2130	0	4.491	0.519
442	316	2130	0	227.356	0.181	442	316	2130	0	227.356	0.513
443	316	2130	0	227.356	0.164	443	316	2130	0	227.356	0.347
444	316	2130	0	227.356	0.126	444	316	2130	0	227.356	0.217
445	316	2130	0	227.356	0.035	445	316	2130	0	227.356	0.207
446	316	2130	0	227.356	0.096	446	316	2130	0	227.356	0.209
447	317	2130	0	227.356	0.090	447	317	2130	0	227.356	0.206
448	317	2130	0	227.356	0.072	448	317	2130	0	227.356	0.192
449	317	2130	0	227.356	0.115	449	317	2130	0	227.356	0.501
450	317	2130	0	227.356	0.061	450	317	2130	0	227.356	0.281
451	317	2130	0	227.356	0.083	451	317	2130	0	227.356	0.232
452	317	2130	0	227.356	0.047	452	317	2130	0	227.356	0.207
453	317	2130	0	227.356	0.073	453	317	2130	0	227.356	0.209
454	317	2130	0	227.356	0.169	454	317	2130	0	227.356	0.296
455	317	2130	0	5.007	0.213	455	317	2130	0	4.055	1.139
456	317	2130	0	5.007	0.220	456	317	2130	0	5.007	1.452
457	317	2130	0	4.819	0.227	457	317	2130	0	6.466	1.386
											4.819

(Continued)

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Table 4 (Continued)

RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER.	SIG. MT.	RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER.	SIG. MT.
				(SEC.)	(FT.)					(SEC.)	(FT.)
360	308	510	0	227.556	0.119	340	308	510	0	7.254	0.725
361	308	510	0	227.556	0.119	341	308	510	0	6.496	0.756
362	308	510	0	227.556	0.118	342	308	510	0	6.443	0.751
363	308	510	0	227.556	0.118	343	308	510	0	6.896	0.647
364	308	510	0	227.556	0.083	344	308	510	0	7.288	0.600
365	308	510	0	227.556	0.140	345	308	510	0	7.556	0.870
366	308	510	0	227.556	0.140	346	308	510	0	7.003	0.750
367	308	510	0	227.556	0.160	347	308	510	0	5.332	0.759
368	308	510	0	227.556	0.075	348	308	510	0	227.556	0.45
369	308	510	0	227.556	0.073	349	308	510	0	3.703	0.506
370	309	510	0	227.556	0.066	350	308	510	0	227.556	0.468
371	309	510	0	227.556	0.083	351	308	510	0	3.703	0.351
372	309	510	0	227.556	0.064	352	308	510	0	227.556	0.305
373	309	510	0	227.556	0.071	353	308	510	0	3.911	0.281
374	309	510	0	227.556	0.124	354	308	510	0	227.556	0.322
375	309	510	0	227.556	0.124	355	308	510	0	227.556	0.322
376	309	510	0	227.556	0.073	356	308	510	0	227.556	0.223
377	309	510	0	227.556	0.164	357	308	510	0	3.831	0.389
378	309	510	0	227.556	0.073	358	308	510	0	3.814	0.389
379	309	510	0	227.556	0.059	359	308	510	0	227.556	0.367
380	309	510	0	227.556	0.065	360	308	510	0	3.703	0.351
381	309	510	0	227.556	0.237	361	308	510	0	227.556	0.250
382	309	510	0	227.556	0.124	362	308	510	0	227.556	0.221
383	309	510	0	227.556	0.124	363	308	510	0	227.556	0.221
384	309	510	0	227.556	0.164	364	308	510	0	227.556	0.221
385	309	510	0	227.556	0.124	365	308	510	0	227.556	0.221
386	309	510	0	227.556	0.051	366	308	510	0	227.556	0.221
387	309	510	0	227.556	0.261	367	308	510	0	227.556	0.221
388	310	510	0	227.556	0.120	368	308	510	0	227.556	0.221
389	310	510	0	227.556	0.059	369	308	510	0	227.556	0.221
390	310	510	0	227.556	0.120	370	308	510	0	227.556	0.221
391	310	510	0	227.556	0.123	371	308	510	0	227.556	0.221
392	310	510	0	227.556	0.123	372	308	510	0	227.556	0.221
393	310	510	0	227.556	0.123	373	308	510	0	227.556	0.221
394	310	510	0	227.556	0.123	374	308	510	0	227.556	0.221
395	310	510	0	227.556	0.123	375	308	510	0	227.556	0.221
396	310	510	0	227.556	0.123	376	308	510	0	227.556	0.221
397	310	510	0	227.556	0.123	377	308	510	0	227.556	0.221
398	310	510	0	227.556	0.123	378	308	510	0	227.556	0.221
399	311	510	0	227.556	0.123	379	308	510	0	227.556	0.221
400	311	510	0	227.556	0.123	380	308	510	0	227.556	0.221
401	311	510	0	227.556	0.123	381	308	510	0	227.556	0.221
402	311	510	0	227.556	0.123	382	308	510	0	227.556	0.221
403	311	510	0	227.556	0.123	383	308	510	0	227.556	0.221
404	311	510	0	227.556	0.123	384	308	510	0	227.556	0.221
405	311	510	0	227.556	0.123	385	308	510	0	227.556	0.221
406	311	510	0	227.556	0.123	386	308	510	0	227.556	0.221
407	311	510	0	227.556	0.123	387	308	510	0	227.556	0.221
408	311	510	0	227.556	0.123	388	308	510	0	227.556	0.221
409	311	510	0	227.556	0.123	389	308	510	0	227.556	0.221
410	311	510	0	227.556	0.123	390	308	510	0	227.556	0.221
411	311	510	0	227.556	0.123	391	308	510	0	227.556	0.221
412	311	510	0	227.556	0.123	392	308	510	0	227.556	0.221
413	311	510	0	227.556	0.123	393	308	510	0	227.556	0.221
414	311	510	0	227.556	0.123	394	308	510	0	227.556	0.221
415	311	510	0	227.556	0.123	395	308	510	0	227.556	0.221
416	311	510	0	227.556	0.123	396	308	510	0	227.556	0.221
417	311	510	0	227.556	0.123	397	308	510	0	227.556	0.221
418	311	510	0	227.556	0.123	398	308	510	0	227.556	0.221

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(Continued)

Table 4 (Continued)

RECORD NUMBER	JULIAN DATE	TIME	B&D POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)	RECORD NUMBER	JULIAN DATE	TIME	B&D POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)
281	303	730	0	227.556	0.059	281	303	730	0	227.556	0.059
282	303	930	0	227.556	0.058	282	303	930	0	227.556	0.058
283	303	1130	0	227.556	0.037	283	303	1130	0	227.556	0.037
284	303	1330	0	4.108	0.084	284	303	1330	0	5.675	0.140
285	303	1530	0	227.556	0.116	285	303	1530	0	5.675	0.140
286	303	1730	0	227.556	0.051	286	303	1730	0	5.816	1.184
287	303	1930	0	227.556	0.094	287	303	1930	0	5.931	1.154
288	303	2130	0	227.556	0.084	288	303	2130	0	6.144	0.971
289	303	2330	0	227.556	0.104	289	303	2330	0	6.055	0.934
290	304	130	0	227.556	0.124	290	304	130	0	6.819	0.004
291	304	330	0	227.556	0.090	291	304	330	0	6.481	0.372
292	304	530	1	227.556	0.053	292	304	530	0	4.466	0.032
293	304	730	0	227.556	0.059	293	304	730	0	5.931	0.953
294	304	930	0	227.556	0.056	294	304	930	0	5.814	0.948
295	304	1130	0	227.556	0.063	295	304	1130	0	6.188	0.971
296	304	1330	0	227.556	0.077	296	304	1330	0	5.814	0.973
297	304	1530	0	227.556	0.064	297	304	1530	0	6.188	0.699
298	304	1730	0	227.556	0.086	298	304	1730	0	4.055	0.685
299	304	1930	3	4.184	0.103	299	304	1930	0	227.556	0.592
300	304	2130	0	227.556	0.052	300	304	2130	0	4.055	0.511
301	304	2330	0	227.556	0.095	301	304	2330	0	5.703	0.556
302	305	130	0	227.556	0.057	302	305	130	0	4.468	0.405
303	305	330	0	227.556	0.077	303	305	330	0	5.814	0.733
304	305	530	0	227.556	0.064	304	305	530	0	6.188	0.405
305	305	730	0	227.556	0.040	305	305	730	0	4.055	0.685
306	305	930	0	227.556	0.059	306	305	930	0	227.556	0.592
307	305	1130	0	227.556	0.141	307	305	1130	0	4.055	0.511
308	305	1330	0	227.556	0.062	308	305	1330	0	5.703	0.556
309	305	1530	0	227.556	0.102	309	305	1530	0	4.468	0.405
310	305	1730	0	227.556	0.061	310	305	1730	0	5.703	0.405
311	305	1930	0	227.556	0.040	311	305	1930	0	4.055	0.685
312	305	2130	0	227.556	0.059	312	305	2130	0	227.556	0.592
313	305	2330	0	227.556	0.045	313	305	2330	0	4.055	0.511
314	306	130	0	227.556	0.141	314	306	130	0	4.188	0.595
315	306	330	0	227.556	0.062	315	306	330	0	5.931	0.369
316	306	530	0	227.556	0.102	316	306	530	0	5.814	0.684
317	306	730	0	227.556	0.071	317	306	730	0	5.931	0.948
318	306	930	0	227.556	0.085	318	306	930	0	1.911	0.619
319	306	1130	0	227.556	0.051	319	306	1130	0	1.703	0.748
320	306	1330	0	227.556	0.154	320	306	1330	0	4.188	0.637
321	306	1530	0	227.556	0.070	321	306	1530	0	6.055	0.567
322	306	1730	0	227.556	0.058	322	306	1730	0	4.055	0.504
323	306	1930	0	227.556	0.070	323	306	1930	0	1.911	0.324
324	306	2130	0	227.556	0.108	324	306	2130	0	1.703	0.405
325	306	2330	0	227.556	0.054	325	306	2330	0	4.055	0.684
326	307	130	0	227.556	0.071	326	307	130	0	5.814	0.271
327	307	330	0	227.556	0.154	327	307	330	0	5.814	0.343
328	307	530	0	227.556	0.070	328	307	530	0	5.673	0.579
329	307	730	0	227.556	0.213	329	307	730	0	5.673	1.546
330	307	930	0	227.556	0.060	330	307	930	0	7.298	1.479
331	307	1130	0	227.556	0.126	331	307	1130	0	7.298	1.479
332	307	1330	0	227.556	0.053	332	307	1330	0	5.931	0.527
333	307	1530	0	227.556	0.110	333	307	1530	0	5.931	0.581
334	307	1730	0	227.556	0.089	334	307	1730	0	5.931	0.229
335	307	1930	0	227.556	0.134	335	307	1930	0	5.931	0.443
336	307	2130	0	227.556	0.134	336	307	2130	0	5.931	0.443
337	307	2330	0	227.556	0.117	337	307	2330	0	5.931	0.343
338	308	130	0	227.556	0.154	338	308	130	0	5.931	0.443
339	308	330	0	227.556	0.098	339	308	330	0	5.931	0.619
340	308	530	0	227.556	0.102	340	308	530	0	7.298	0.619

(Continued)

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Table 4 (Continued)

RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)	RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)
222	298	930	0	4.819	0.825	222	298	930	114	0.432	9.003
223	1130	0	5.007	0.723	0.568	223	298	1130	0	5.936	5.780
224	298	1130	0	5.673	0.568	224	298	1130	0	5.673	2.956
225	1530	0	5.007	0.360	0.360	225	298	1130	0	5.673	2.441
226	298	1530	0	4.005	0.190	226	298	1730	1	5.673	0.000
227	1730	0	4.005	0.162	0.162	227	298	1930	64	0	0
228	1930	0	4.165	0.162	0.162	228	298	2130	164	0	0
229	2130	0	5.931	0.169	0.169	229	298	2130	128	0	0
230	298	2130	0	4.055	0.317	230	298	2130	0	0	0
231	130	0	3.814	0.361	0.361	231	298	2130	0	0	0
232	299	130	0	3.931	0.390	232	299	2130	112	0	0
233	299	130	0	1.931	0.253	233	299	2130	0	0	0
234	299	130	0	227.556	0.104	234	299	2130	0	0	0
235	1130	0	227.556	0.126	0.126	235	299	2130	112	0	0
236	299	1130	0	227.556	0.133	236	299	1130	96	0	0
237	1530	0	227.556	0.098	0.098	237	299	1130	0	0	0
238	299	1530	0	227.556	0.167	238	299	1130	0	0	0
239	1730	0	227.556	0.161	0.161	239	299	1130	0	0	0
240	299	1730	0	227.556	0.261	240	299	1930	0	0	0
241	299	2130	0	227.556	0.063	241	299	2130	0	0	0
242	300	2130	0	227.556	0.061	242	299	2130	0	0	0
243	300	330	0	227.556	0.069	243	300	130	96	0	0
244	300	330	0	227.556	0.163	244	300	130	0	0	0
245	300	330	0	227.556	0.095	245	300	130	0	0	0
246	300	330	0	227.556	0.173	246	300	130	0	0	0
247	300	1130	0	4.819	0.454	247	300	130	128	0	0
248	300	1130	0	4.819	0.477	248	300	130	0	0	0
249	300	1530	0	227.556	0.444	249	300	130	0	0	0
250	300	1530	0	227.556	0.352	250	300	130	0	0	0
251	300	1930	0	5.007	0.301	251	300	130	0	0	0
252	300	2130	0	227.556	0.292	252	300	130	0	0	0
253	300	2130	0	4.664	0.228	253	300	2130	128	0	0
254	301	130	0	5.007	0.256	254	300	2130	0	0	0
255	301	330	0	227.556	0.378	255	301	130	0	0	0
256	301	330	0	5.007	0.339	256	301	130	0	0	0
257	301	730	0	227.556	0.376	257	301	130	0	0	0
258	301	930	0	5.211	0.518	258	301	130	0	0	0
259	301	930	0	5.007	0.394	259	301	130	0	0	0
260	301	1130	0	4.330	0.360	260	301	130	0	0	0
261	301	1130	0	4.035	0.307	261	301	130	0	0	0
262	301	1530	0	4.188	0.411	262	301	130	0	0	0
263	301	1930	0	4.035	0.443	263	301	1730	0	0	0
264	301	2130	0	227.556	0.488	264	301	1930	16	0	0
265	301	2330	1	4.188	0.388	265	301	2130	64	0	0
266	301	2330	1	227.556	0.230	266	301	2130	0	0	0
267	302	130	0	4.330	0.260	267	302	130	0	0	0
268	302	330	0	227.556	0.208	268	302	130	0	0	0
269	302	730	0	4.481	0.141	269	302	130	0	0	0
270	302	930	0	4.188	0.152	270	302	130	0	0	0
271	302	1130	0	227.556	0.128	271	302	130	0	0	0
272	302	1330	1	227.556	0.094	272	302	130	0	0	0
273	302	1330	1	227.556	0.045	273	302	130	0	0	0
274	302	1730	0	227.556	0.03	274	302	130	0	0	0
275	302	1930	0	227.556	0.066	275	302	1730	0	0	0
276	302	2130	0	227.556	0.063	276	302	1930	0	0	0
277	302	2330	0	227.556	0.078	277	302	2130	0	0	0
278	303	130	0	227.556	0.038	278	303	130	0	0	0
279	303	130	0	227.556	0.069	279	303	130	0	0	0
280	303	130	0	227.556	0.049	280	303	130	0	0	0

(Continued)

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Table 4 (Continued)

RECORD NUMBER	JULIAN DATE	TIME	BND POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)	RECORD NUMBER	JULIAN DATE	TIME	BND POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)
163	293	1130	0	227.556	0.140	163	293	1110	0	227.556	0.471
164	1330	0	227.556	0.175	164	293	1330	0	227.556	0.553	
165	293	1530	0	227.556	0.087	165	293	1530	0	227.556	0.422
166	1730	0	227.556	0.083	166	293	1730	0	227.556	0.356	
167	293	1930	0	227.556	0.110	167	293	1930	0	227.556	0.330
168	293	2130	0	227.556	0.049	168	293	2130	0	227.556	0.357
159	293	2330	0	227.556	0.103	169	293	2330	0	227.556	0.
170	294	1330	0	227.556	0.133	170	294	1330	0	227.556	0.
171	294	1530	0	227.556	0.101	171	294	1530	0	227.556	0.
172	294	1730	0	227.556	0.064	172	294	1730	0	227.556	0.400
173	294	1930	0	227.556	0.116	173	294	1930	0	227.556	0.417
174	294	2130	0	227.556	0.191	174	294	2130	0	227.556	0.476
175	294	2330	0	227.556	0.082	175	294	2330	0	227.556	0.418
176	294	1330	0	227.556	0.125	176	294	1330	0	227.556	0.440
177	294	1530	0	227.556	0.230	177	294	1530	0	227.556	0.521
178	294	1730	0	227.556	0.085	178	294	1730	0	227.556	0.719
179	294	1930	0	227.556	0.207	179	294	1930	0	227.556	0.644
180	294	2130	0	227.556	0.206	180	294	2130	0	227.556	0.641
181	294	2330	0	227.556	0.163	181	294	2330	0	227.556	0.623
182	295	1330	0	227.556	0.194	182	295	1330	0	227.556	0.570
183	295	1530	0	227.556	0.103	183	295	1530	0	227.556	0.527
184	295	1730	0	227.556	0.072	184	295	1730	0	227.556	0.483
185	295	1930	0	227.556	0.121	185	295	1930	0	227.556	0.755
186	295	2130	0	227.556	0.089	186	295	2130	0	227.556	0.733
187	295	2330	0	227.556	0.122	187	295	2330	0	227.556	0.560
188	295	1330	0	227.556	0.083	188	295	1330	0	227.556	0.444
189	295	1530	0	227.556	0.079	189	295	1530	0	227.556	0.319
190	295	1730	0	227.556	0.201	190	295	1730	0	227.556	0.345
191	295	1930	0	227.556	0.072	191	295	1930	0	227.556	0.448
192	295	2130	0	227.556	0.056	192	295	2130	0	227.556	0.432
193	295	2330	0	227.556	0.155	193	295	2330	0	227.556	0.488
194	296	1330	0	227.556	0.159	194	296	1330	0	227.556	0.457
195	296	1530	0	227.556	0.066	195	296	1530	0	227.556	0.563
196	296	1730	0	227.556	0.080	196	296	1730	0	227.556	0.622
197	296	1930	0	227.556	0.063	197	296	1930	0	227.556	0.620
198	296	2130	0	227.556	0.066	198	296	2130	0	227.556	0.543
199	296	2330	0	227.556	0.064	199	296	2330	0	227.556	0.588
200	296	1330	0	227.556	0.064	200	296	1330	0	227.556	0.596
201	296	1530	0	227.556	0.120	201	296	1530	0	227.556	0.565
202	296	1730	0	227.556	0.059	202	296	1730	0	227.556	0.527
203	296	1930	0	227.556	0.055	203	296	1930	0	227.556	0.563
204	296	2130	0	227.556	0.051	204	296	2130	0	227.556	0.594
205	296	2330	0	227.556	0.052	205	296	2330	0	227.556	0.555
206	297	1330	0	227.556	0.066	206	297	1330	0	227.556	0.511
207	297	1530	0	227.556	0.064	207	297	1530	0	227.556	0.550
208	297	1730	0	227.556	0.054	208	297	1730	0	227.556	0.366
209	297	1930	0	227.556	0.147	209	297	1930	0	227.556	0.
210	297	2130	0	227.556	0.059	210	297	2130	0	227.556	0.
211	297	2330	0	227.556	0.051	211	297	2330	0	227.556	0.
212	297	1330	0	227.556	0.066	212	297	1330	0	227.556	0.225
213	297	1530	0	227.556	0.064	213	297	1530	0	227.556	0.201
214	297	1730	0	227.556	0.054	214	297	1730	0	227.556	0.196
215	297	1930	0	227.556	0.147	215	297	1930	0	227.556	0.213
216	297	2130	0	227.556	0.046	216	297	2130	0	227.556	0.175
217	297	2330	0	227.556	0.052	217	297	2330	0	227.556	0.157
218	298	1330	0	227.556	0.027	218	298	1330	0	227.556	0.
219	298	1530	0	227.556	0.093	219	298	1530	0	227.556	0.
220	298	1730	0	227.556	0.062	220	298	1730	0	227.556	0.
221	298	1930	0	227.556	0.037	221	298	1930	0	227.556	0.
222	298	2130	0	227.556	0.039	222	298	2130	0	227.556	0.
223	298	2330	0	227.556	0.092	223	298	2330	0	227.556	0.
224	299	1330	0	227.556	0.128	224	299	1330	0	227.556	0.
225	299	1530	0	227.556	0.090	225	299	1530	0	227.556	0.
226	299	1730	0	227.556	0.021	226	299	1730	0	227.556	0.
227	299	1930	0	227.556	0.112	227	299	1930	0	227.556	0.
228	299	2130	0	227.556	0.012	228	299	2130	0	227.556	0.
229	299	2330	0	227.556	0.055	229	299	2330	0	227.556	0.
230	299	1330	0	227.556	0.128	230	299	1330	0	227.556	0.
231	299	1530	0	227.556	0.090	231	299	1530	0	227.556	0.
232	299	1730	0	227.556	0.021	232	299	1730	0	227.556	0.
233	299	1930	0	227.556	0.112	233	299	1930	0	227.556	0.
234	299	2130	0	227.556	0.012	234	299	2130	0	227.556	0.
235	299	2330	0	227.556	0.055	235	299	2330	0	227.556	0.
236	299	1330	0	227.556	0.128	236	299	1330	0	227.556	0.
237	299	1530	0	227.556	0.090	237	299	1530	0	227.556	0.
238	299	1730	0	227.556	0.021	238	299	1730	0	227.556	0.
239	299	1930	0	227.556	0.112	239	299	1930	0	227.556	0.
240	299	2130	0	227.556	0.012	240	299	2130	0	227.556	0.
241	299	2330	0	227.556	0.055	241	299	2330	0	227.556	0.
242	299	1330	0	227.556	0.128	242	299	1330	0	227.556	0.
243	299	1530	0	227.556	0.090	243	299	1530	0	227.556	0.
244	299	1730	0	227.556	0.021	244	299	1730	0	227.556	0.
245	299	1930	0	227.556	0.112	245	299	1930	0	227.556	0.
246	299	2130	0	227.556	0.012	246	299	2130	0	227.556	0.
247	299	2330	0	227.556	0.055	247	299	2330	0	227.556	0.
248	299	1330	0	227.556	0.128	248	299	1330	0	227.556	0.
249	299	1530	0	227.556	0.090	249	299	1530	0	227.556	0.
250	299	1730	0	227.556	0.021	250	299	1730	0	227.556	0.
251	299	1930	0	227.556	0.112	251	299	1930	0	227.556	0.
252	299	2130	0	227.556	0.012	252	299	2130	0	227.556	0.
253	299	2330	0	227.556	0.055	253	299	2330	0	227.556	0.
254	299	1330	0	227.556	0.128	254	299	1330	0	227.556	0.
255	299	1530	0	227.556	0.090	255	299	1530	0	227.556	0.
256	299	1730	0	227.556	0.021	256	299	1730	0	227.556	0.
257	299	1930	0	227.556	0.112	257	299	1930	0	227.556	0.
258	299	2130	0	227.556	0.012	258	299	2130	0	227.556	0.
259	299	2330	0	227.556	0.055	259	299	2330	0	227.556	0.
260	299	1330	0	227.556	0.128	260	299	1330	0	227.556	0.
261	299	1530	0	227.556	0.090	261	299	1530	0	227.556	0.
262	299	1730	0	227.556	0.021	262	299	1730	0	227.556	0.
263	299	1930	0	227.556							

Table 4 (Continued)

RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)	RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)
114	1330	0	227, 536	0.064	104	288	1330	0	0	4.611	0.620
115	1330	0	227, 536	0.084	105	288	1330	0	0	4.055	0.602
116	1730	0	227, 536	0.085	106	288	1730	0	0	4.644	0.714
117	289	1930	0	227, 536	0.147	107	288	1930	0	0	4.724
118	286	2130	0	227, 536	0.136	108	288	2130	0	0	4.488
119	285	2330	0	227, 536	0.155	109	288	2330	0	0	5.007
119	289	1330	0	227, 536	0.150	110	289	1330	0	0	1.052
119	289	1330	0	227, 536	0.144	111	289	1330	0	0	1.614
119	289	1330	0	227, 536	0.174	112	289	1330	0	0	1.943
119	289	1330	0	227, 536	0.158	113	289	1330	0	0	4.819
119	289	1330	0	227, 536	0.035	114	289	1330	0	0	3.703
119	289	1330	0	227, 536	0.639	115	289	1330	0	0	1.719
119	289	1330	0	227, 536	0.190	116	289	1330	0	0	5.432
119	289	1330	0	227, 536	0.237	117	289	1330	0	0	4.188
119	289	1330	0	227, 536	0.230	118	289	1330	0	0	2.788
119	289	1330	0	227, 536	0.330	119	289	1330	0	0	4.330
119	289	1330	0	227, 536	0.144	120	289	1330	0	0	2.458
119	289	1330	0	227, 536	0.250	121	289	1330	0	0	2.487
120	289	2130	0	227, 536	0.214	122	289	1930	0	0	4.055
120	289	2130	0	227, 536	0.191	123	289	1930	0	0	1.670
121	289	2330	0	227, 536	0.767	124	289	2130	0	0	3.703
122	290	1330	0	227, 536	0.819	125	290	1330	0	0	1.627
122	290	1330	0	227, 536	0.707	126	290	1330	0	0	3.361
123	290	1330	0	227, 536	0.664	127	290	1330	0	0	3.432
124	290	1330	0	227, 536	0.675	128	290	1330	0	0	5.007
124	290	1330	0	227, 536	0.620	129	290	1330	0	0	3.164
125	290	1330	0	227, 536	0.4819	130	290	1330	0	0	5.332
125	290	1330	0	227, 536	0.392	131	290	1330	0	0	5.673
125	290	1330	0	227, 536	0.330	132	290	1330	0	0	2.365
126	290	1330	0	227, 536	0.250	133	290	1330	0	0	4.330
126	290	1330	0	227, 536	0.255	134	290	1330	0	0	1.476
126	290	1330	0	227, 536	0.142	135	290	1330	0	0	1.700
127	290	1330	0	227, 536	0.130	136	290	1330	0	0	1.627
127	290	1330	0	227, 536	0.118	137	290	1330	0	0	1.627
127	290	1330	0	227, 536	0.216	138	290	1330	0	0	1.627
128	290	1330	0	227, 536	0.151	139	290	1330	0	0	1.627
128	290	1330	0	227, 536	0.172	140	290	1330	0	0	1.627
128	290	1330	0	227, 536	0.054	141	290	1330	0	0	1.627
128	290	1330	0	227, 536	0.056	142	290	1330	0	0	1.627
129	290	1330	0	227, 536	0.075	143	290	1330	0	0	1.627
129	290	1330	0	227, 536	0.069	144	290	1330	0	0	1.627
129	290	1330	0	227, 536	0.090	145	290	1330	0	0	1.627
130	290	1330	0	227, 536	0.132	146	290	1330	0	0	1.627
130	290	1330	0	227, 536	0.177	147	290	1330	0	0	1.627
131	290	1330	0	227, 536	0.132	148	290	1330	0	0	1.627
131	290	1330	0	227, 536	0.132	149	290	1330	0	0	1.627
131	290	1330	0	227, 536	0.132	150	290	1330	0	0	1.627
132	290	2130	0	227, 536	0.172	151	290	1930	0	0	1.627
132	290	2130	0	227, 536	0.054	152	290	1930	0	0	1.627
132	290	2130	0	227, 536	0.056	153	290	1930	0	0	1.627
133	290	2130	0	227, 536	0.074	154	290	1930	0	0	1.627
133	290	2130	0	227, 536	0.046	155	290	1930	0	0	1.627
134	290	2130	0	227, 536	0.075	156	290	1930	0	0	1.627
134	290	2130	0	227, 536	0.069	157	290	1930	0	0	1.627
134	290	2130	0	227, 536	0.096	158	290	1930	0	0	1.627
135	290	2130	0	227, 536	0.070	159	290	1930	0	0	1.627
135	290	2130	0	227, 536	0.042	160	290	1930	0	0	1.627
135	290	2130	0	227, 536	0.077	161	290	1930	0	0	1.627
136	290	1330	0	227, 536	0.074	162	290	1330	0	0	1.627
136	290	1330	0	227, 536	0.074	163	290	1330	0	0	1.627
136	290	1330	0	227, 536	0.074	164	290	1330	0	0	1.627
137	290	1330	0	227, 536	0.074	165	290	1330	0	0	1.627
137	290	1330	0	227, 536	0.074	166	290	1330	0	0	1.627
137	290	1330	0	227, 536	0.074	167	290	1330	0	0	1.627
138	290	1330	0	227, 536	0.074	168	290	1330	0	0	1.627
138	290	1330	0	227, 536	0.074	169	290	1330	0	0	1.627
138	290	1330	0	227, 536	0.074	170	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	171	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	172	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	173	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	174	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	175	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	176	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	177	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	178	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	179	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	180	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	181	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	182	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	183	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	184	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	185	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	186	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	187	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	188	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	189	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	190	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	191	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	192	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	193	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	194	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	195	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	196	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	197	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	198	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	199	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	200	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	201	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	202	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	203	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	204	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	205	290	1330	0	0	1.627
139	290	1330	0	227, 536	0.074	206	290	1330	0	0	1.627
1											

Table 4 (Continued)

RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)	RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)
65	283	1530	0	227.556	0.070	45	283	1530	9	4.819	0.558
66	283	1730	0	227.556	0.070	46	283	1730	0	4.330	0.565
67	283	1930	0	227.556	0.064	47	283	1930	5	5.007	0.581
68	283	2130	0	227.556	0.132	48	283	2130	0	4.188	0.648
69	283	2330	0	227.556	0.051	49	283	2330	0	4.644	0.551
50	284	1530	0	227.556	0.076	50	284	1530	0	4.188	1.112
51	284	1730	0	227.556	0.089	51	284	1730	11	3.931	1.025
52	284	1930	0	227.556	0.131	52	284	1930	12	4.644	0.661
53	284	2130	0	227.556	0.166	53	284	2130	8	1.187	1.187
54	284	2330	0	227.556	0.114	54	284	2330	0	5.432	1.479
55	284	930	0	227.556	0.117	55	284	930	14	5.211	2.256
56	284	1130	0	227.556	0.119	56	284	1130	0	5.432	1.227
57	284	1330	0	227.556	0.121	57	284	1330	0	5.936	1.123
58	284	1530	0	227.556	0.175	58	284	1530	1	2.494	1.481
59	284	1730	0	227.556	0.146	59	284	1730	3	5.432	1.839
50	284	1930	0	227.556	0.166	60	284	1930	0	5.675	1.583
51	284	2130	0	227.556	0.176	61	284	2130	0	6.671	1.550
52	284	2330	0	227.556	0.133	62	284	2330	0	5.211	1.550
53	285	1130	0	227.556	0.007	63	285	1130	0	5.211	1.500
63	285	1330	0	227.556	0.121	64	285	1330	0	5.432	1.227
64	285	1530	0	227.556	0.210	65	285	1530	0	5.936	1.123
65	285	1730	0	227.556	0.192	66	285	1730	0	6.045	1.481
66	285	1930	0	227.556	0.279	67	285	1930	0	6.936	2.221
57	285	2130	0	227.556	0.279	68	285	2130	0	6.225	2.236
58	285	2330	0	227.556	0.257	69	285	2330	0	6.644	3.481
59	285	930	0	227.556	0.279	70	285	1130	0	5.675	3.481
70	285	1130	0	227.556	0.279	71	285	1130	0	5.675	3.481
71	285	1330	0	227.556	0.165	72	285	1330	0	5.432	1.227
72	285	1530	0	227.556	0.210	73	285	1530	0	5.936	1.123
73	285	1730	0	227.556	0.192	74	285	1730	0	6.045	1.481
74	285	1930	0	227.556	0.279	75	285	1930	0	6.936	2.221
75	285	2130	0	227.556	0.279	76	285	2130	0	6.225	2.236
76	285	2330	0	227.556	0.257	77	285	2330	0	6.644	3.481
77	285	930	0	227.556	0.279	78	285	1130	0	5.675	3.481
78	285	1130	0	227.556	0.279	79	285	1130	0	5.675	3.481
79	286	1330	0	227.556	0.644	80	286	1330	0	5.432	1.227
80	286	1530	0	227.556	0.323	81	286	1530	0	5.936	1.123
81	286	1730	0	227.556	0.303	82	286	1730	0	6.045	1.481
82	286	1930	0	227.556	0.428	83	286	1930	0	6.936	2.221
83	286	2130	0	227.556	0.437	84	286	2130	0	6.225	2.236
84	286	2330	0	227.556	0.333	85	286	2330	0	6.644	3.481
85	286	930	0	227.556	0.271	86	286	1130	0	5.675	3.481
86	286	1130	0	227.556	0.271	87	286	1130	0	5.675	3.481
87	287	1330	0	227.556	0.054	88	287	1330	0	5.432	4.481
88	287	1530	0	227.556	0.245	89	287	1530	0	5.936	1.123
89	287	1730	0	227.556	0.206	90	287	1730	0	6.045	1.481
90	287	1930	0	227.556	0.307	91	287	1930	0	6.936	2.221
91	287	2130	0	227.556	0.333	92	287	2130	0	6.225	2.236
92	287	2330	0	227.556	0.296	93	287	2330	0	6.644	3.481
93	287	930	0	227.556	0.208	94	287	1130	0	5.675	3.481
94	287	1130	0	227.556	0.208	95	287	1130	0	5.675	3.481
95	287	1330	0	227.556	0.432	96	287	1330	0	5.432	4.481
96	287	1530	0	227.556	0.214	97	287	1530	0	5.936	1.123
97	287	1730	0	227.556	0.214	98	287	1730	0	6.045	1.481
98	287	1930	0	227.556	0.333	99	287	1930	0	6.936	2.221
99	287	2130	0	227.556	0.271	100	287	2130	0	6.225	2.236
100	288	1330	0	227.556	0.954	101	288	1330	0	6.644	3.481
101	288	1530	0	227.556	0.231	102	288	1530	0	5.007	4.481
102	288	1730	0	227.556	0.987	103	288	1730	0	5.007	4.481
103	288	1930	0	227.556	0.260	104	288	1930	4	0.548	4.481

(Continued)

(Sheet 2 of 13)

Table 4  
Wave Data Record Summary  
Ludington Harbor, Michigan

a. Cage 7; Ludington Harbor Channel					
6 October 1983 - 6 December 1983					
Data Recovery Rate: 98.8%					

b. Cage 67; Lake Michigan Site					
6 October 1983 - 8 December 1983					
Data Recovery Rate: 90.8%					

RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (sec.)	SIG. HI. (ft.)
1	229	2330	58	0.	0.
2	230	130	32	0.	0.
3	230	110	34	0.	0.
4	230	330	55	0.	0.
5	230	730	43	0.	0.
6	230	930	32	0.	0.
7	230	1130	0	227.556	0.136
8	230	1330	0	227.556	0.194
9	230	1530	0	227.556	0.246
10	230	1730	16	5.007	0.300
11	230	1930	0	227.556	0.370
12	230	2130	0	227.556	0.209
13	230	2330	0	227.556	0.314
14	231	130	0	227.556	0.243
15	231	330	0	227.556	0.177
16	231	530	0	227.556	0.268
17	231	730	0	227.556	0.055
18	231	930	0	227.556	0.182
19	231	1130	0	227.556	0.130
20	231	1330	0	227.556	0.169
21	231	1530	0	227.556	0.191
22	231	1730	0	227.556	0.096
23	231	1930	0	4.183	0.060
24	231	2130	0	227.556	0.076
25	231	2330	0	227.556	0.074
26	232	130	0	227.556	0.055
27	232	330	0	227.556	0.209
28	232	530	0	227.556	0.047
29	232	730	0	227.556	0.043
30	232	930	0	227.556	0.061
31	232	1130	21	0.	0.
32	232	1330	0	227.556	0.071
33	232	1530	0	227.556	0.075
34	232	1730	0	227.556	0.081
35	232	1930	0	227.556	0.060
36	232	2130	0	227.556	0.038
37	232	2330	0	227.556	0.034
38	233	130	0	227.556	0.047
39	233	330	0	227.556	0.069
40	233	530	0	227.556	0.071
41	233	730	0	227.556	0.106
42	233	930	0	227.556	0.078
43	233	1130	0	227.556	0.049
44	233	1330	0	227.556	0.102

(Continued)

(Sheet 1 of 13)

Table 3 (Concluded)

RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)	RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)
615	275	2201	0	227, 51, 1	0, 173	275	2203	0	0	0	0
616	275	2400	0	227, 55, 6	0, 235	616	2205	2600	0	0	0
617	275	200	0	4, 41, 0	0, 261	275	2205	200	0	0	0
618	276	400	0	227, 51, 1	0, 277	617	2206	276	0	0	0
619	276	600	0	227, 55, 6	0, 292	618	2206	450	0	0	0
620	276	800	0	227, 55, 6	0, 298	619	2206	610	0	0	0
621	276	1000	0	227, 55, 6	0, 249	620	2206	440	0	0	0
622	276	1200	0	227, 55, 6	0, 222	621	2206	1000	0	0	0
623	276	1400	0	227, 55, 6	0, 380	622	2206	1200	0	0	0
624	276	1600	0	227, 55, 6	0, 298	623	2206	1400	0	0	0
625	276	1800	0	227, 55, 6	0, 346	624	2206	1600	0	0	0
626	276	2000	0	227, 51, 6	0, 183	625	2206	1800	0	0	0
627	276	2200	0	227, 55, 6	0, 194	626	2207	0	0	0	0
628	276	2400	0	227, 55, 6	0, 278	627	2207	2700	0	0	0
629	277	200	0	227, 55, 6	0, 228	628	2207	2400	0	0	0
630	277	400	0	227, 55, 6	0, 238	629	2207	200	0	0	0
631	277	600	0	227, 55, 6	0, 140	630	2207	400	0	0	0
632	277	800	0	227, 55, 6	0, 208	631	2207	600	0	0	0
633	277	1000	0	227, 55, 6	0, 414	632	2207	400	0	0	0
634	277	1200	0	0,	0,	633	2207	1000	0	0	0
635	277	1400	609	0,	0,	634	2207	1200	0	0	0
						635	2207	1400	0	0	0
						636	2207	1600	0	0	0

(Sheet 12 of 12)

Table 3 (Continued)

RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. MT. (FT.)	RECORD NUMBER	JULIAN DATE	BAD POINTS	SIG. PER. (SEC.)	SIG. MT. (FT.)
574	270	2400	1	227, 555	0.114	574	271	2400	1	114
575	271	2010	0	227, 555	0.025	575	271	2000	41	114
576	271	4010	0	227, 555	0.086	576	271	4000	32	114
577	271	6010	0	227, 555	0.203	577	271	6000	11	114
578	271	8010	0	227, 555	0.019	578	271	8000	42	114
579	271	10010	0	227, 555	0.061	579	271	10000	10	114
580	271	12010	0	227, 555	0.076	580	271	12000	10	114
581	271	14010	0	227, 555	0.062	581	271	14000	37	114
582	271	16010	0	227, 555	0.065	582	271	16000	37	114
583	271	18010	0	227, 555	0.035	583	271	18000	24	114
584	271	20010	0	227, 555	0.045	584	271	20000	41	114
585	271	22010	0	227, 555	0.029	585	271	22000	41	114
586	271	24010	0	227, 555	0.075	586	271	24000	35	114
587	271	26010	0	227, 555	0.048	587	271	26000	40	114
588	271	28010	0	227, 555	0.025	588	271	28000	25	114
589	271	30010	0	227, 555	0.025	589	271	30000	25	114
590	271	32010	0	227, 555	0.025	590	271	32000	25	114
591	271	34010	0	227, 555	0.025	591	271	34000	25	114
592	272	1010	0	227, 555	0.091	592	272	1000	50	114
593	272	1210	0	227, 555	0.022	593	272	1200	50	114
594	272	1410	0	227, 555	0.022	594	272	1400	50	114
595	272	1610	0	227, 555	0.022	595	272	1600	50	114
596	272	1810	0	227, 555	0.022	596	272	1800	50	114
597	272	2010	0	227, 555	0.022	597	272	2000	50	114
598	272	2210	0	227, 555	0.022	598	272	2200	50	114
599	272	2410	0	227, 555	0.022	599	272	2400	50	114
600	273	1010	0	227, 555	0.061	600	273	1000	65	114
601	273	1210	0	227, 555	0.048	601	273	1200	65	114
602	273	1410	0	227, 555	0.075	602	273	1400	71	114
603	273	1610	0	227, 555	0.063	603	273	1600	51	114
604	273	1810	0	227, 555	0.063	604	273	1800	71	114
605	273	2010	0	227, 555	0.023	605	273	2000	65	114
606	273	2210	0	227, 555	0.023	606	273	2200	65	114
607	273	2410	0	227, 555	0.023	607	273	2400	65	114
608	273	2610	0	227, 555	0.023	608	273	2600	65	114
609	273	2810	0	227, 555	0.023	609	273	2800	65	114
610	273	3010	0	227, 555	0.023	610	273	3000	65	114
611	273	3210	0	227, 555	0.023	611	273	3200	65	114
612	273	3410	0	227, 555	0.023	612	273	3400	65	114
613	273	3610	0	227, 555	0.023	613	273	3600	65	114
614	273	3810	0	227, 555	0.023	614	273	3800	65	114
615	273	4010	0	227, 555	0.023	615	273	4000	65	114
616	274	8010	0	227, 555	0.062	616	274	8000	12	114
617	274	10010	0	227, 555	0.033	617	274	10000	12	114
618	274	12010	0	227, 555	0.032	618	274	12000	15	114
619	274	14010	0	227, 555	0.036	619	274	14000	14	114
620	274	16010	0	227, 555	0.088	620	274	16000	400	114
621	274	18010	0	227, 555	0.148	621	274	18000	627	114
622	274	20010	0	227, 555	0.061	622	274	20000	627	114
623	274	22010	0	227, 555	0.042	623	274	22000	627	114
624	274	24010	0	227, 555	0.054	624	274	24000	627	114
625	274	26010	0	227, 555	0.052	625	274	26000	627	114
626	274	28010	0	227, 555	0.052	626	274	28000	627	114
627	274	30010	0	227, 555	0.052	627	274	30000	627	114
628	274	32010	0	227, 555	0.052	628	274	32000	627	114
629	274	34010	0	227, 555	0.052	629	274	34000	627	114
630	275	12010	0	227, 555	0.100	630	275	12000	1000	114
631	275	14010	0	227, 555	0.157	631	275	14000	1000	114
632	275	16010	0	227, 555	0.120	632	275	16000	1000	114
633	275	18010	0	227, 555	0.175	633	275	18000	1000	114
634	275	20010	0	227, 555	0.192	634	275	20000	1000	114

(Continued)

(Sheet 11 of 12)

Table 3 (Continued)

RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)	RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)
517	266	211		4.155	0.191	517	160	203	0	0	0
513	266	401	3	4.104	0.187	518	264	400	0	0	0
519	266	601	0	4.184	0.185	519	266	600	0	0	0
520	266	801	0	4.055	0.161	521	264	800	0	0	2,194
521	266	1000	0	4.184	0.158	521	264	1000	0	0	0
522	266	1200	0	4.055	0.150	522	265	1200	0	0	0
523	266	1400	0	3.934	0.223	523	265	1400	0	0	0
524	266	1600	0	3.931	0.125	524	265	1600	0	0	0
525	266	1800	0	227.553	0.070	525	266	1800	0	0	0
526	266	2000	0	227.553	0.053	526	266	2000	0	0	0
527	266	2200	0	227.553	0.062	527	266	2200	0	0	0
528	266	2400	0	3.814	0.101	528	266	2400	0	0	0
529	267	2000	0	4.055	0.185	529	267	2000	0	0	0
530	267	401	0	4.184	0.150	530	267	400	0	0	0
531	267	601	0	4.055	0.126	531	267	600	0	0	0
532	267	801	0	5.007	0.309	532	267	800	0	0	0
533	267	1000	0	5.007	0.169	533	267	1000	0	0	0
534	267	1200	0	5.007	0.137	534	267	1200	0	0	0
535	267	1400	0	5.007	0.101	535	267	1400	0	0	0
536	267	1600	0	5.007	0.086	536	267	1600	0	0	0
537	267	1800	0	5.007	0.057	537	267	1800	0	0	0
538	267	2000	0	227.554	0.254	538	267	2000	0	0	0
539	267	2200	0	227.554	0.215	539	267	2200	0	0	0
540	267	2400	0	227.554	0.230	540	267	2400	0	0	0
541	268	2000	0	5.007	0.217	541	267	2400	0	0	0
542	268	401	0	5.007	0.194	542	267	2400	0	0	0
543	268	601	0	5.007	0.155	543	267	2400	0	0	0
544	268	801	0	5.007	0.124	544	267	2400	0	0	0
545	268	1000	0	5.007	0.101	545	267	2400	0	0	0
546	268	1200	0	5.007	0.078	546	267	2400	0	0	0
547	268	1400	0	5.007	0.057	547	267	2400	0	0	0
548	268	1600	0	5.007	0.036	548	267	2400	0	0	0
549	268	1800	0	5.007	0.015	549	267	2400	0	0	0
550	268	2000	0	227.555	0.055	550	267	2400	0	0	0
551	268	2200	0	227.555	0.055	551	267	2400	0	0	0
552	268	2400	0	227.555	0.055	552	267	2400	0	0	0
553	268	2600	0	227.555	0.055	553	267	2400	0	0	0
554	268	2800	0	227.555	0.055	554	267	2400	0	0	0
555	268	3000	0	227.555	0.055	555	267	2400	0	0	0
556	268	3200	0	227.555	0.055	556	267	2400	0	0	0
557	268	3400	0	227.555	0.055	557	267	2400	0	0	0
558	268	3600	0	227.555	0.055	558	267	2400	0	0	0
559	268	3800	0	227.555	0.055	559	267	2400	0	0	0
560	268	4000	0	227.555	0.055	560	267	2400	0	0	0
561	268	4200	0	227.555	0.055	561	267	2400	0	0	0
562	268	4400	0	227.555	0.055	562	267	2400	0	0	0
563	268	4600	0	227.555	0.055	563	267	2400	0	0	0
564	268	4800	0	227.555	0.055	564	267	2400	0	0	0
565	268	5000	0	227.555	0.055	565	267	2400	0	0	0
566	268	5200	0	227.555	0.055	566	267	2400	0	0	0
567	268	5400	0	227.555	0.055	567	267	2400	0	0	0
568	268	5600	0	227.555	0.055	568	267	2400	0	0	0
569	268	5800	0	227.555	0.055	569	267	2400	0	0	0
570	268	6000	0	227.555	0.055	570	267	2400	0	0	0
571	268	6200	0	227.555	0.055	571	267	2400	0	0	0
572	268	6400	0	227.555	0.055	572	267	2400	0	0	0
573	268	6600	0	227.555	0.055	573	267	2400	0	0	0
574	268	6800	0	227.555	0.055	574	267	2400	0	0	0
575	268	7000	0	227.555	0.055	575	267	2400	0	0	0

(Continued)

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Table 3 (Continued)

RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)	RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)
454	261	4:1	1	227.554	0.1521	453	261	4:1	1	17	1
455	261	6:12	0	227.554	0.1536	455	261	6:0	0	600	0
456	261	8:00	0	227.554	0.1536	456	261	6:0	0	16	0
457	261	10:00	0	227.554	0.1528	457	261	10:00	0	0	0
458	261	12:00	1	227.554	0.1521	458	261	12:00	1	1210	1
459	261	14:00	1	227.554	0.1449	459	261	14:00	1	141	1
460	261	16:00	0	227.554	0.1527	460	261	16:00	0	161	0
461	261	18:00	0	227.554	0.1525	461	261	18:00	0	180	0
462	261	20:00	0	227.554	0.1525	462	261	20:00	0	200	0
463	261	22:00	0	227.554	0.1521	463	261	22:00	0	220	0
464	261	24:00	0	227.554	0.1529	464	261	24:00	0	240	0
465	261	2:00	1	227.554	0.1506	465	261	2:00	1	2470	1
466	261	4:00	0	227.554	0.1527	466	261	4:00	0	247	0
467	261	6:00	0	227.554	0.1522	467	261	6:00	0	247	0
468	261	8:00	0	227.554	0.1509	468	261	8:00	0	247	0
469	262	10:00	0	227.554	0.1501	469	262	10:00	0	247	0
470	262	12:00	0	227.554	0.1501	470	262	12:00	0	247	0
471	262	14:00	0	227.554	0.1501	471	262	14:00	0	247	0
472	262	16:00	0	227.554	0.1501	472	262	16:00	0	247	0
473	262	18:00	0	227.554	0.1501	473	262	18:00	0	247	0
474	262	20:00	0	227.554	0.1501	474	262	20:00	0	247	0
475	262	22:00	0	227.554	0.1501	475	262	22:00	0	247	0
476	262	24:00	0	227.554	0.1501	476	262	24:00	0	247	0
477	262	2:00	0	227.554	0.1501	477	262	2:00	0	247	0
478	262	4:00	0	227.554	0.1501	478	262	4:00	0	247	0
479	262	6:00	0	227.554	0.1501	479	262	6:00	0	247	0
480	262	8:00	0	227.554	0.1501	480	262	8:00	0	247	0
481	262	10:00	0	227.554	0.1501	481	262	10:00	0	247	0
482	262	12:00	0	227.554	0.1501	482	262	12:00	0	247	0
483	262	14:00	0	227.554	0.1501	483	262	14:00	0	247	0
484	262	16:00	0	227.554	0.1501	484	262	16:00	0	247	0
485	262	18:00	0	227.554	0.1501	485	262	18:00	0	247	0
486	262	20:00	0	227.554	0.1501	486	262	20:00	0	247	0
487	262	22:00	0	227.554	0.1501	487	262	22:00	0	247	0
488	262	24:00	0	227.554	0.1501	488	262	24:00	0	247	0
489	262	2:00	0	227.554	0.1501	489	262	2:00	0	247	0
490	262	4:00	0	227.554	0.1501	490	262	4:00	0	247	0
491	262	6:00	0	227.554	0.1501	491	262	6:00	0	247	0
492	262	8:00	0	227.554	0.1501	492	262	8:00	0	247	0
493	262	10:00	0	227.554	0.1501	493	262	10:00	0	247	0
494	262	12:00	0	227.554	0.1501	494	262	12:00	0	247	0
495	262	14:00	0	227.554	0.1501	495	262	14:00	0	247	0
496	262	16:00	0	227.554	0.1501	496	262	16:00	0	247	0
497	262	18:00	0	227.554	0.1501	497	262	18:00	0	247	0
498	262	20:00	0	227.554	0.1501	498	262	20:00	0	247	0
499	262	22:00	0	227.554	0.1501	499	262	22:00	0	247	0
500	262	24:00	0	227.554	0.1501	500	262	24:00	0	247	0
501	262	2:00	0	227.554	0.1501	501	262	2:00	0	247	0
502	262	4:00	0	227.554	0.1501	502	262	4:00	0	247	0
503	262	6:00	0	227.554	0.1501	503	262	6:00	0	247	0
504	262	8:00	0	227.554	0.1501	504	262	8:00	0	247	0
505	262	10:00	0	227.554	0.1501	505	262	10:00	0	247	0
506	262	12:00	0	227.554	0.1501	506	262	12:00	0	247	0
507	262	14:00	0	227.554	0.1501	507	262	14:00	0	247	0
508	262	16:00	0	227.554	0.1501	508	262	16:00	0	247	0
509	262	18:00	0	227.554	0.1501	509	262	18:00	0	247	0
510	262	20:00	0	227.554	0.1501	510	262	20:00	0	247	0
511	262	22:00	0	227.554	0.1501	511	262	22:00	0	247	0
512	262	24:00	0	227.554	0.1501	512	262	24:00	0	247	0
513	262	2:00	0	227.554	0.1501	513	262	2:00	0	247	0
514	262	4:00	0	227.554	0.1501	514	262	4:00	0	247	0
515	262	6:00	0	227.554	0.1501	515	262	6:00	0	247	0
516	262	8:00	0	227.554	0.1501	516	262	8:00	0	247	0
517	262	10:00	0	227.554	0.1501	517	262	10:00	0	247	0
518	262	12:00	0	227.554	0.1501	518	262	12:00	0	247	0
519	262	14:00	0	227.554	0.1501	519	262	14:00	0	247	0
520	262	16:00	0	227.554	0.1501	520	262	16:00	0	247	0
521	262	18:00	0	227.554	0.1501	521	262	18:00	0	247	0
522	262	20:00	0	227.554	0.1501	522	262	20:00	0	247	0
523	262	22:00	0	227.554	0.1501	523	262	22:00	0	247	0
524	262	24:00	0	227.554	0.1501	524	262	24:00	0	247	0
525	262	2:00	0	227.554	0.1501	525	262	2:00	0	247	0
526	262	4:00	0	227.554	0.1501	526	262	4:00	0	247	0
527	262	6:00	0	227.554	0.1501	527	262	6:00	0	247	0
528	262	8:00	0	227.554	0.1501	528	262	8:00	0	247	0
529	262	10:00	0	227.554	0.1501	529	262	10:00	0	247	0
530	262	12:00	0	227.554	0.1501	530	262	12:00	0	247	0
531	262	14:00	0	227.554	0.1501	531	262	14:00	0	247	0
532	262	16:00	0	227.554	0.1501	532	262	16:00	0	247	0
533	262	18:00	0	227.554	0.1501	533	262	18:00	0	247	0
534	262	20:00	0	227.554	0.1501	534	262	20:00	0	247	0
535	262	22:00	0	227.554	0.1501	535	262	22:00	0	247	0
536	262	24:00	0	227.554	0.1501	536	262	24:00	0	247	0
537	262	2:00	0	227.554	0.1501	537	262	2:00	0	247	0
538	262	4:00	0	227.554	0.1501	538	262	4:00	0	247	0
539	262	6:00	0	227.554	0.1501	539	262	6:00	0	247	0
540	262	8:00	0	227.554	0.1501	540	262	8:00	0	247	0
541	262	10:00	0	227.554	0.1501	541	262	10:00	0	247	0
542	262	12:00	0	227.554	0.1501	542	262	12:00	0	247	0
543	262	14:00	0	227.554	0.1501	543	262	14:00	0	247	0
544	262	16:00	0	227.554	0.1501	544	262	16:00	0	247	0
545	262	18:00	0	227.554	0.1501	545	262	18:00	0	247	0
546	262	20:00	0	227.554	0.1501	546	262	20:00	0	247	0
547	262	22:00	0	227.554	0.1501	547	262	22:00	0	247	0
548	262	24:00	0	227.554	0.1501	548	262	24:00	0	247	0
549	262	2:00	0	227.554	0.1501	549	262	2:00	0	247	0
550	262	4:00	0	227.554	0.1501	550	262	4:00	0	247	0
551	262	6:00	0	227.554	0.1501	551	262	6:00	0	247	0
552	262	8:00	0	227.554	0.1501	552	262	8:00	0	247	0
553	262	10:00	0	227.554	0.1501	553	262	10:00	0	247	0
554	262	12:00	0	227.554	0.1501	554	262	12:00	0	247	0
555	262	14:00	0	227.554	0.1501	555	262	14:00	0	247	0
556	262	16:00	0	227.554	0.1501	556	262	16:00	0	247	0
557	262	18:00									

Tabl 4 (Continued)

RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER.	SIG. HT.	RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER.	SIG. HT.	
				(SEC.)	(FT.)					(SEC.)	(FT.)	
526	2130	0	227.556	0.716	5276	327	2130	0	3.911	0.	1,350	
527	2300	0	227.556	0.007	5277	327	2330	352	0.	0.	0.	
528	130	0	227.556	0.455	5278	130	682	0.	0.	0.	0.	
529	328	0	227.556	0.011	5279	328	330	0.	7.268	5.494	6.194	
530	330	0	227.556	5.007	5280	328	330	0.	4.225	6.225	6.316	
531	530	1	227.556	0.465	5281	328	330	0.	6.225	6.225	6.316	
532	730	0	4.819	0.521	5282	730	0	0.	6.225	6.225	6.316	
533	328	910	0	5.007	5283	328	930	7.288	5.437	6.225	6.316	
534	1130	0	5.007	0.591	5284	1130	0	0.	5.936	4.387	4.387	
535	328	1330	0	5.007	5285	1330	0	0.	7.288	4.872	4.872	
536	1530	0	5.007	0.562	5286	1530	0	0.	4.225	4.225	4.225	
537	328	1730	0	5.432	5287	1730	1	7.268	4.384	4.384	4.384	
538	1930	0	5.007	0.634	5288	1930	0	0.	6.225	6.225	6.316	
539	328	2130	1	5.432	5289	2130	0	0.	6.225	6.225	6.316	
540	2330	0	5.007	0.916	5290	2330	0	0.	6.225	6.225	6.316	
541	130	0	4.644	1.125	5291	130	0	0.	6.225	6.225	6.316	
542	329	330	0	5.007	0.899	5292	330	0	0.	5.936	4.183	4.183
543	530	330	0	5.211	0.804	5293	510	0	0.	5.225	4.19	4.19
544	730	0	5.007	1.029	5294	730	0	0.	5.936	3.319	3.319	
545	930	0	5.007	0.919	5295	930	0	0.	5.936	3.319	3.319	
546	329	950	0	5.007	0.990	5296	910	0	0.	5.916	3.049	3.049
547	1130	0	5.916	0.851	5297	1130	0	0.	6.225	6.225	6.316	
548	1330	0	5.432	0.857	5298	1330	0	0.	6.225	6.225	6.316	
549	1530	0	5.007	0.160	5299	1530	0	0.	5.211	5.211	5.667	
550	1730	0	5.432	0.153	5300	1730	0	0.	0.	0.	0.	
551	1930	0	5.007	0.899	5301	1930	0	0.	0.	0.	0.	
552	329	530	0	5.211	0.004	5302	1910	144	0.	0.	0.	0.
553	730	0	5.007	1.029	5303	730	0	0.	5.936	3.319	3.319	
554	930	0	5.007	0.919	5304	910	0	0.	5.916	3.049	3.049	
555	329	950	0	5.007	0.851	5305	910	0	0.	6.225	6.225	6.316
556	1130	0	5.916	0.851	5306	1130	0	0.	6.225	6.225	6.316	
557	1330	0	5.432	0.857	5307	1330	0	0.	6.225	6.225	6.316	
558	1530	0	5.007	0.160	5308	1530	0	0.	5.211	5.211	5.667	
559	1730	0	5.432	0.153	5309	1730	0	0.	0.	0.	0.	
560	1930	0	5.007	0.899	5310	1930	0	0.	0.	0.	0.	
561	329	530	0	5.211	0.004	5311	930	0	0.	0.	0.	0.
562	730	0	5.007	1.029	5312	730	0	0.	5.936	3.319	3.319	
563	930	0	5.007	0.919	5313	910	0	0.	5.916	3.049	3.049	
564	329	950	0	5.007	0.851	5314	910	0	0.	6.225	6.225	6.316
565	1130	0	5.916	0.851	5315	1130	0	0.	6.225	6.225	6.316	
566	1330	0	5.432	0.857	5316	1330	0	0.	6.225	6.225	6.316	
567	1530	0	5.007	0.160	5317	1530	0	0.	5.211	5.211	5.667	
568	1730	0	5.432	0.153	5318	1730	0	0.	0.	0.	0.	
569	1930	0	5.007	0.899	5319	1930	0	0.	0.	0.	0.	
570	329	530	0	5.211	0.004	5320	930	0	0.	0.	0.	0.
571	730	0	5.007	1.029	5321	730	0	0.	5.936	3.319	3.319	
572	930	0	5.007	0.919	5322	910	0	0.	5.916	3.049	3.049	
573	329	950	0	5.007	0.851	5323	910	0	0.	6.225	6.225	6.316
574	1130	0	5.916	0.851	5324	1130	0	0.	6.225	6.225	6.316	
575	1330	0	5.432	0.857	5325	1330	0	0.	6.225	6.225	6.316	
576	1530	0	5.007	0.160	5326	1530	0	0.	5.211	5.211	5.667	
577	1730	0	5.432	0.153	5327	1730	0	0.	0.	0.	0.	
578	1930	0	5.007	0.899	5328	1930	0	0.	0.	0.	0.	
579	329	530	0	5.211	0.004	5329	930	0	0.	0.	0.	0.
580	730	0	5.007	1.029	5330	730	0	0.	5.936	3.319	3.319	
581	930	0	5.007	0.919	5331	910	0	0.	5.916	3.049	3.049	
582	329	950	0	5.007	0.851	5332	910	0	0.	6.225	6.225	6.316
583	1130	0	5.916	0.851	5333	1130	0	0.	6.225	6.225	6.316	
584	1330	0	5.432	0.857	5334	1330	0	0.	6.225	6.225	6.316	
585	1530	0	5.007	0.160	5335	1530	0	0.	5.211	5.211	5.667	
586	1730	0	5.432	0.153	5336	1730	0	0.	0.	0.	0.	
587	1930	0	5.007	0.899	5337	1930	0	0.	0.	0.	0.	
588	329	530	0	5.211	0.004	5338	930	0	0.	0.	0.	0.
589	730	0	5.007	1.029	5339	730	0	0.	5.936	3.319	3.319	
590	930	0	5.007	0.919	5340	910	0	0.	5.916	3.049	3.049	
591	329	950	0	5.007	0.851	5341	910	0	0.	6.225	6.225	6.316
592	1130	0	5.916	0.851	5342	1130	0	0.	6.225	6.225	6.316	
593	1330	0	5.432	0.857	5343	1330	0	0.	6.225	6.225	6.316	
594	1530	0	5.007	0.160	5344	1530	0	0.	5.211	5.211	5.667	
595	1730	0	5.432	0.153	5345	1730	0	0.	0.	0.	0.	
596	1930	0	5.007	0.899	5346	1930	0	0.	0.	0.	0.	
597	329	530	0	5.211	0.004	5347	930	0	0.	0.	0.	0.
598	730	0	5.007	1.029	5348	730	0	0.	5.936	3.319	3.319	
599	930	0	5.007	0.919	5350	910	0	0.	5.916	3.049	3.049	
600	329	950	0	5.007	0.851	5351	910	0	0.	6.225	6.225	6.316
601	1130	0	5.916	0.851	5352	1130	0	0.	6.225	6.225	6.316	
602	1330	0	5.432	0.857	5353	1330	0	0.	6.225	6.225	6.316	
603	1530	0	5.007	0.160	5354	1530	0	0.	5.211	5.211	5.667	
604	1730	0	5.432	0.153	5355	1730	0	0.	0.	0.	0.	
605	1930	0	5.007	0.899	5356	1930	0	0.	0.	0.	0.	
606	329	530	0	5.211	0.004	5357	930	0	0.	0.	0.	0.
607	730	0	5.007	1.029	5358	730	0	0.	5.936	3.319	3.319	
608	930	0	5.007	0.919	5359	910	0	0.	5.916	3.049	3.049	
609	329	950	0	5.007	0.851	5360	910	0	0.	6.225	6.225	6.316
610	1130	0	5.916	0.851	5361	1130	0	0.	6.225	6.225	6.316	
611	1330	0	5.432	0.857	5362	1330	0	0.	6.225	6.225	6.316	
612	1530	0	5.007	0.160	5363	1530	0	0.	5.211	5.211	5.667	
613	1730	0	5.432	0.153	5364	1730	0	0.	0.	0.	0.	
614	1930	0	5.007	0.899	5365	1930	0	0.	0.	0.	0.	
615	329	530	0	5.211	0.004	5366	930	0	0.	0.	0.	0.
616	730	0	5.007	1.029	5367	730	0	0.	5.936	3.319	3.319	
617	930	0	5.007	0.919	5368	910	0	0.	5.916	3.049	3.049	
618	329	530	0	5.211	0.004	5369	930	0	0.	6.225	6.225	6.316
619	1130	0	5.916	0.851	5370	1130	0	0.	6.225	6.225	6.316	
620	1330	0	5.432	0.857	5371	1330	0	0.	6.225	6.225	6.316	
621	1530	0	5.007	0.160	5372	1530	0	0.	5.211	5.211	5.667	
622	1730	0	5.432	0.153	5373	1730	0	0.	0.	0.	0.	
623	1930	0	5.007	0.899	5374	1930	0	0.	0.	0.	0.	
624	329	530	0	5.211	0.004	5375	930	0	0.	0.	0.	0.
625	1130	0	5.916	0.851	5376	1130	0	0.	6.225	6.225	6.316	
626	1330	0	5.432	0.857	5377	1330	0	0.	6.225	6.225	6.316	
627	1530	0	5.007	0.160	5378	1530	0	0.	5.211	5.211	5.667	
628	1730	0	5.432	0.153	5379	1730	0</td					

Table 4 (Continued)

RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)	RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)
635	332	1930	0	5.007	0.306	635	332	1930	0	227.554	0.486
636	332	2130	0	227.556	0.353	636	332	2130	0	227.556	0.628
637	332	2330	0	227.556	0.342	637	332	2330	0	227.556	0.736
638	333	1300	0	5.007	0.432	638	333	1300	0	227.556	0.960
639	333	330	0	5.007	0.429	639	333	330	0	227.556	0.867
640	333	530	0	4.664	0.340	640	333	530	0	4.148	1.437
641	333	730	0	227.556	0.448	641	333	730	1	6.543	4.114
642	333	930	0	5.211	0.642	642	333	930	0	0.	0.
643	333	1130	0	5.007	0.795	643	333	1130	0	0.	0.
644	333	1330	0	5.007	0.543	644	333	1330	0	8.790	5.252
645	333	1530	0	5.211	0.646	645	333	1530	0	6.225	3.996
646	333	1730	0	5.211	0.773	646	333	1730	0	5.916	4.462
647	333	1930	0	5.211	1.166	647	333	1930	0	6.225	4.517
648	333	2130	0	5.007	0.928	648	333	2130	0	6.856	4.503
649	333	2330	0	4.819	0.365	649	333	2330	0	0.	0.
650	334	1300	0	5.007	0.835	650	334	1300	0	0.	0.
651	334	330	0	5.916	1.027	651	334	330	0	3.953	2.772
652	334	530	0	6.225	1.137	652	334	530	0	5.916	4.462
653	334	730	0	5.916	1.227	653	334	730	0	5.916	4.462
654	334	930	0	5.211	1.188	654	334	930	0	6.225	4.517
655	334	1130	0	5.007	1.165	655	334	1130	0	7.888	6.246
656	334	1330	0	4.819	1.093	656	334	1330	0	7.888	6.617
657	334	1530	0	5.007	1.077	657	334	1530	0	6.896	6.254
658	334	1730	0	5.916	1.027	658	334	1730	0	6.896	5.634
659	334	1930	0	5.007	1.023	659	334	1930	0	6.896	5.553
660	334	2130	0	5.211	0.835	660	334	2130	0	6.896	5.889
661	334	2330	0	5.936	0.891	661	334	2330	0	6.896	6.841
662	335	1300	0	5.936	0.912	662	335	1300	0	6.896	6.841
663	335	330	0	5.007	0.734	663	335	330	0	6.896	6.084
664	335	530	0	5.132	0.870	664	335	530	0	6.896	5.427
665	335	730	0	5.007	0.756	665	335	730	0	6.896	5.224
666	335	930	0	5.007	0.733	666	335	930	0	6.896	4.897
667	335	1130	0	4.819	0.718	667	335	1130	0	6.896	4.602
668	335	1330	0	5.007	0.705	668	335	1330	0	6.896	4.220
669	335	1530	0	4.819	0.637	669	335	1530	0	6.896	3.066
670	335	1730	0	4.310	0.539	670	335	1730	0	5.916	3.774
671	335	1930	0	4.664	0.609	671	335	1930	0	6.896	3.669
672	335	2130	0	4.481	0.771	672	335	2130	0	6.896	3.114
673	335	2330	0	5.007	0.689	673	335	2330	0	6.896	2.059
674	336	1300	0	4.819	0.615	674	336	1300	0	6.896	1.881
675	336	330	0	5.007	0.625	675	336	330	0	4.819	1.668
676	336	530	0	4.055	0.595	676	336	530	0	4.819	1.821
677	336	730	0	5.007	0.574	677	336	730	0	5.007	1.601
678	336	930	0	4.664	0.465	678	336	930	0	4.819	1.541
679	336	1130	0	4.481	0.717	679	336	1130	0	4.819	1.497
680	336	1330	0	4.055	0.553	680	336	1330	0	4.819	1.406
681	336	1530	0	4.055	0.400	681	336	1530	0	0.	0.
682	336	1730	0	4.055	0.363	682	336	1730	0	5.007	4.819
683	336	1930	0	4.188	0.59	683	336	1930	0	4.819	4.949
684	336	2130	0	4.055	0.430	684	336	2130	0	5.007	2.330
685	336	2330	0	4.330	0.527	685	336	2330	0	5.211	2.211
686	337	1300	0	4.664	0.415	686	337	1300	0	5.007	2.034
687	337	330	0	4.188	0.269	687	337	330	0	5.007	2.082
688	337	530	0	4.188	0.205	688	337	530	0	5.007	2.300
689	337	730	0	227.556	0.145	689	337	730	0	5.007	2.247
690	337	930	0	227.556	0.077	690	337	930	0	0.	0.
691	337	1130	0	227.556	0.111	691	337	1130	0	0.	0.
692	337	1330	0	227.556	0.123	692	337	1330	0	1.931	1.362
693	337	1530	0	227.556	0.125	693	337	1530	0	1.931	1.375

(Continued)

(Sheet 12 of 13)

Table 4 (Concluded)

RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)	RECORD NUMBER	JULIAN DATE	TIME	BAD POINTS	SIG. PER. (SEC.)	SIG. HT. (FT.)
694	337	1730	0	227, 556	0.205	696	1730	0	4, 481	1, 259	
695	337	1930	0	227, 556	0.252	695	1930	0	4, 481	1, 583	
696	337	2130	0	227, 556	0.153	696	2130	0	0,	0,	
697	337	2330	0	227, 556	0.274	597	2330	256	0,	0,	
698	319	130	0	227, 556	0.186	698	130	0	4, 810	0.993	
699	338	330	0	227, 556	0.155	699	330	0	4, 481	0.853	
700	338	530	0	227, 556	0.233	700	330	0	227, 556	1, 034	
701	338	730	0	227, 556	0.249	701	330	0	227, 556	1, 302	
702	338	930	0	227, 556	0.138	702	330	0	227, 556	0, 595	
703	338	1130	0	227, 556	0.202	703	330	0	227, 556	0, 344	
704	338	1330	0	227, 556	0.173	704	1330	0	227, 556	0, 494	
705	338	1530	0	227, 556	0.155	705	1330	0	227, 556	0, 280	
706	338	1730	0	227, 556	0.204	706	1730	0	227, 556	0, 603	
707	338	1930	0	227, 556	0.188	707	1930	0	227, 556	0, 232	
708	338	2130	0	227, 556	0.134	708	2130	0	227, 556	0, 433	
709	338	2330	0	227, 556	0.160	709	2130	0	227, 556	0, 431	
710	339	130	0	227, 556	0.118	710	330	0	227, 556	0, 451	
711	339	330	0	227, 556	0.181	711	330	0	227, 556	0, 447	
712	339	530	0	227, 556	0.156	712	330	0	227, 556	0, 502	
713	339	730	0	227, 556	0.168	713	330	0	227, 556	0, 568	
714	339	930	0	227, 556	0.143	714	330	0	227, 556	0, 699	
715	339	1130	0	227, 556	0.285	715	330	0	227, 556	1, 435	
716	339	1330	0	227, 556	0.140	716	330	0	227, 556	1, 008	
717	339	1530	0	227, 556	0.176	717	330	0	227, 556	0, 667	
718	339	1730	0	227, 556	0.370	718	330	0	227, 556	0, 816	
719	339	1930	0	227, 556	0.234	719	1930	0	227, 556	0, 462	
720	339	2130	0	227, 556	0.116	720	330	0	227, 556	0, 502	
721	339	2330	0	227, 556	0.097	721	220	0	227, 556	0, 344	
722	340	130	0	227, 556	0.274	722	330	0	227, 556	0, 148	
723	340	330	0	227, 556	0.318	723	340	0	227, 556	0, 749	
724	340	530	0	227, 556	0.208	724	340	0	227, 556	0, 379	
725	340	730	0	227, 556	0.207	725	340	0	227, 556	0, 519	
726	340	930	0	227, 556	0.254	726	340	0	227, 556	0, 202	
727	340	1130	640	0,	0,	727	340	0	227, 556	0, 517	
						728	340	0	227, 556	0, 343	
						729	340	0	227, 556	0, 682	
						730	340	0	227, 556	0, 419	
						731	340	0	227, 556	0, 317	
						732	340	0	227, 556	0, 227	
						733	340	0	227, 556	0, 227	
						734	340	0	227, 556	0, 227	
						735	340	0	227, 556	0, 227	
						736	340	0	227, 556	0, 227	
						737	340	0	227, 556	0, 227	
						738	340	0	227, 556	0, 227	
						739	340	0	227, 556	0, 227	
						740	340	0	227, 556	0, 227	
						741	340	0	227, 556	0, 227	
						742	340	0	227, 556	0, 227	
						743	340	0	227, 556	0, 227	
						744	340	0	227, 556	0, 227	
						745	340	0	227, 556	0, 227	
						746	340	0	227, 556	0, 227	
						747	340	0	227, 556	0, 227	
						748	340	0	227, 556	0, 227	
						749	340	0	227, 556	0, 227	
						750	340	0	227, 556	0, 227	
						751	340	0	227, 556	0, 227	
						752	340	0	227, 556	0,	

(Sheet 13 of 13)

LUDINGTON HARBOR, MICHIGAN  
SIGNIFICANT WAVE HT. VS TIME. GAGE 9  
26 MAY 1983 - 27 JULY 1983

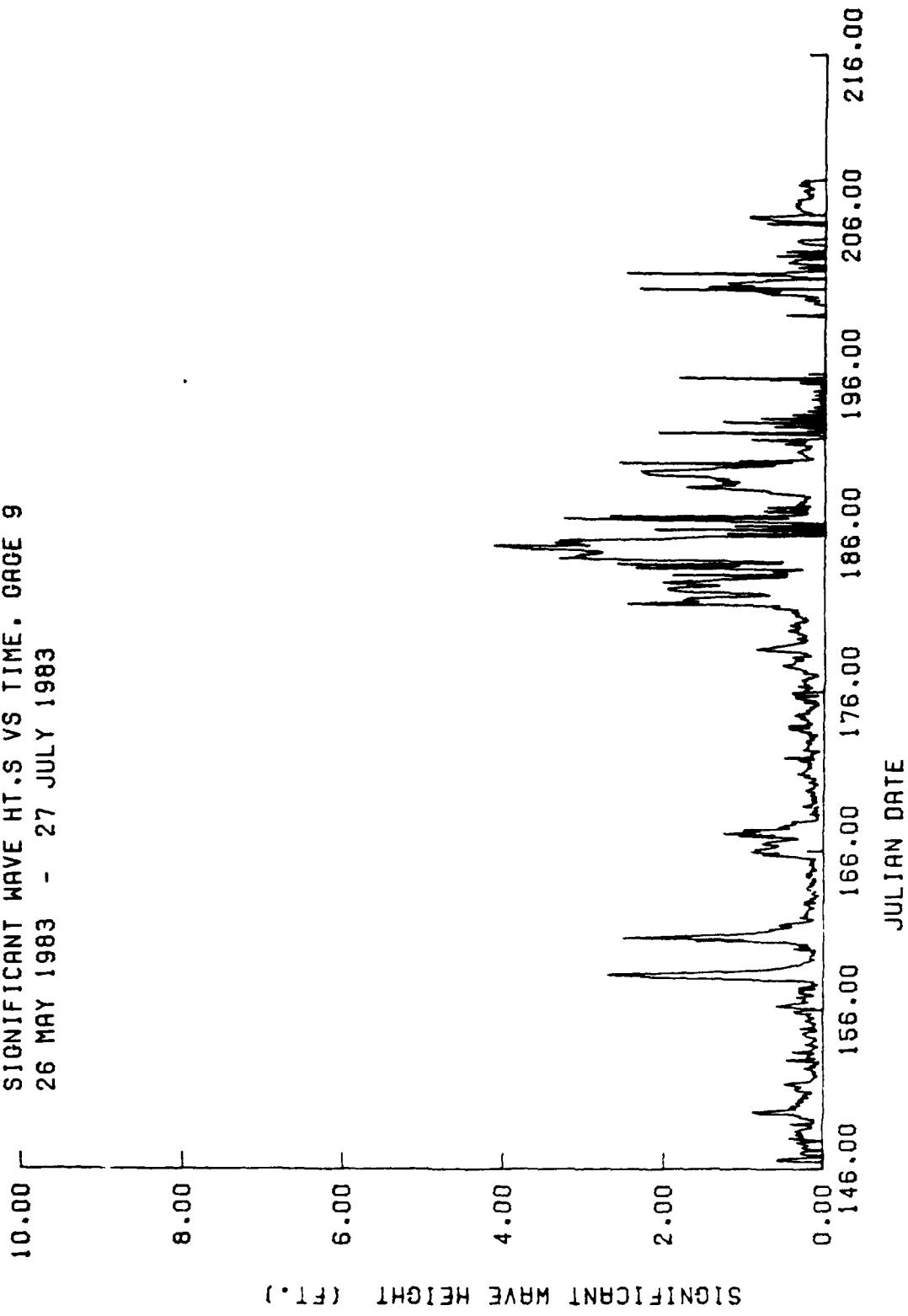


Plate 1

LUDINGTON HARBOR, MICHIGAN

26 MAY 1983 - 26 JULY 1983  
SIGNIFICANT WAVE HT. VS TIME. ORDER 7

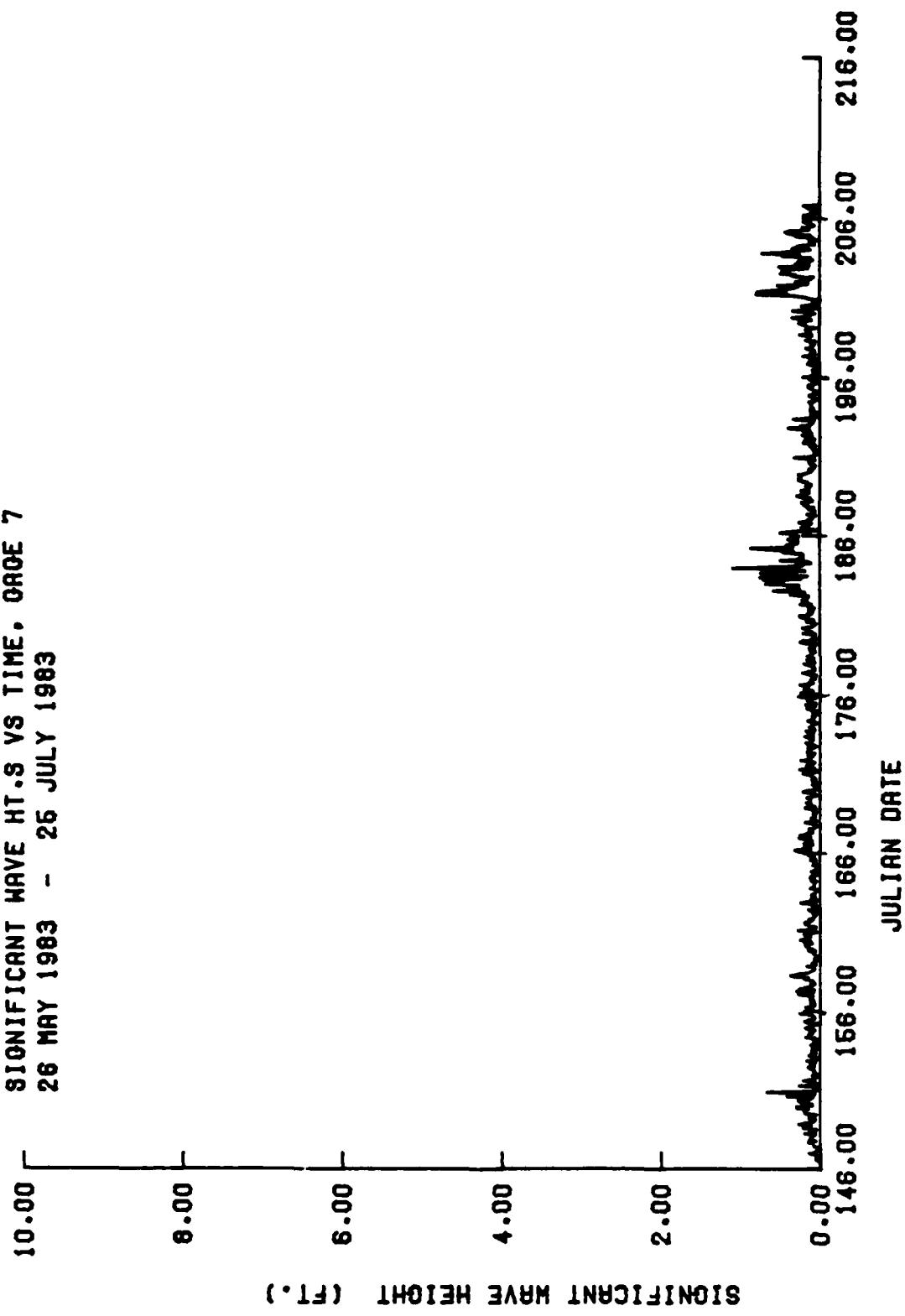
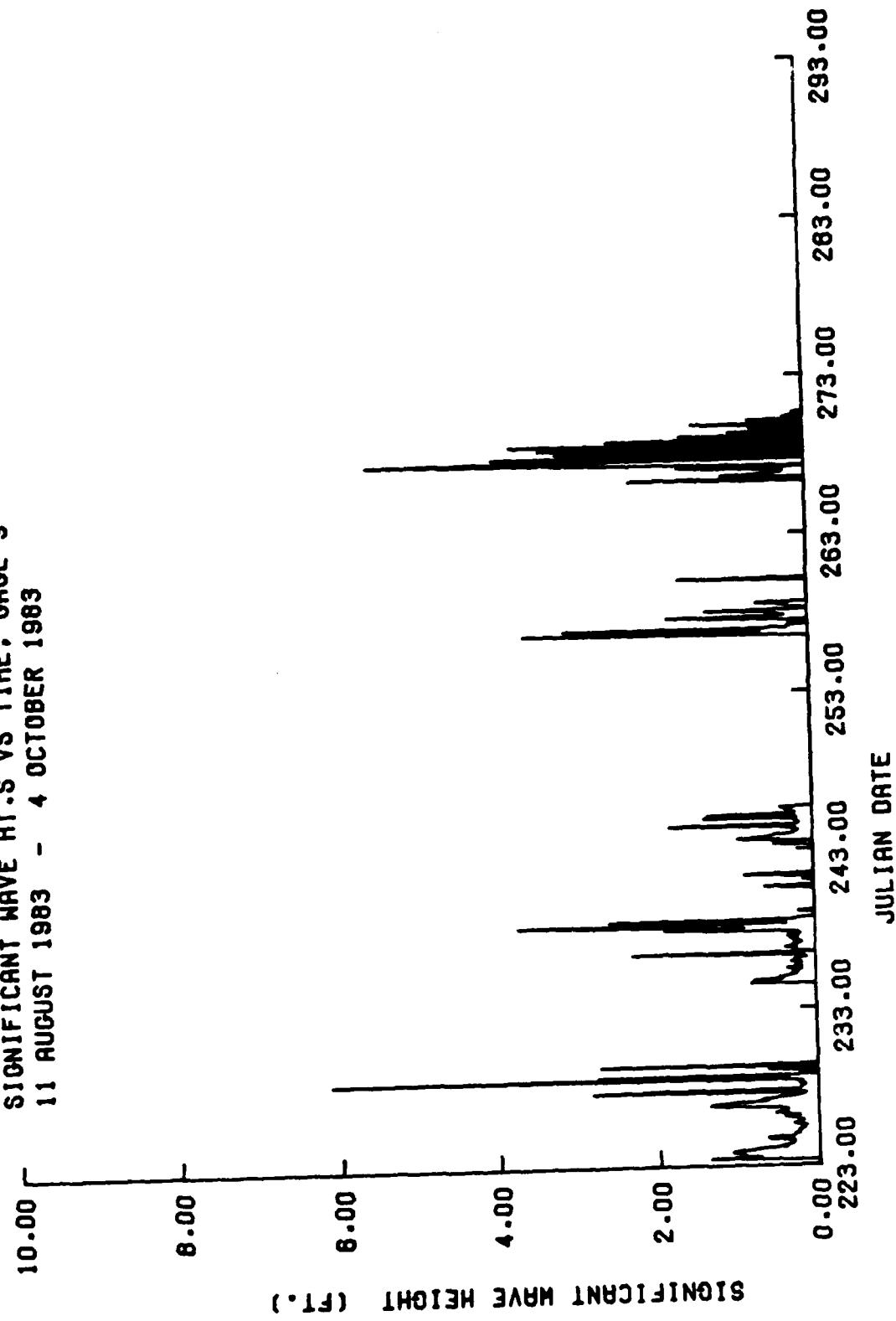
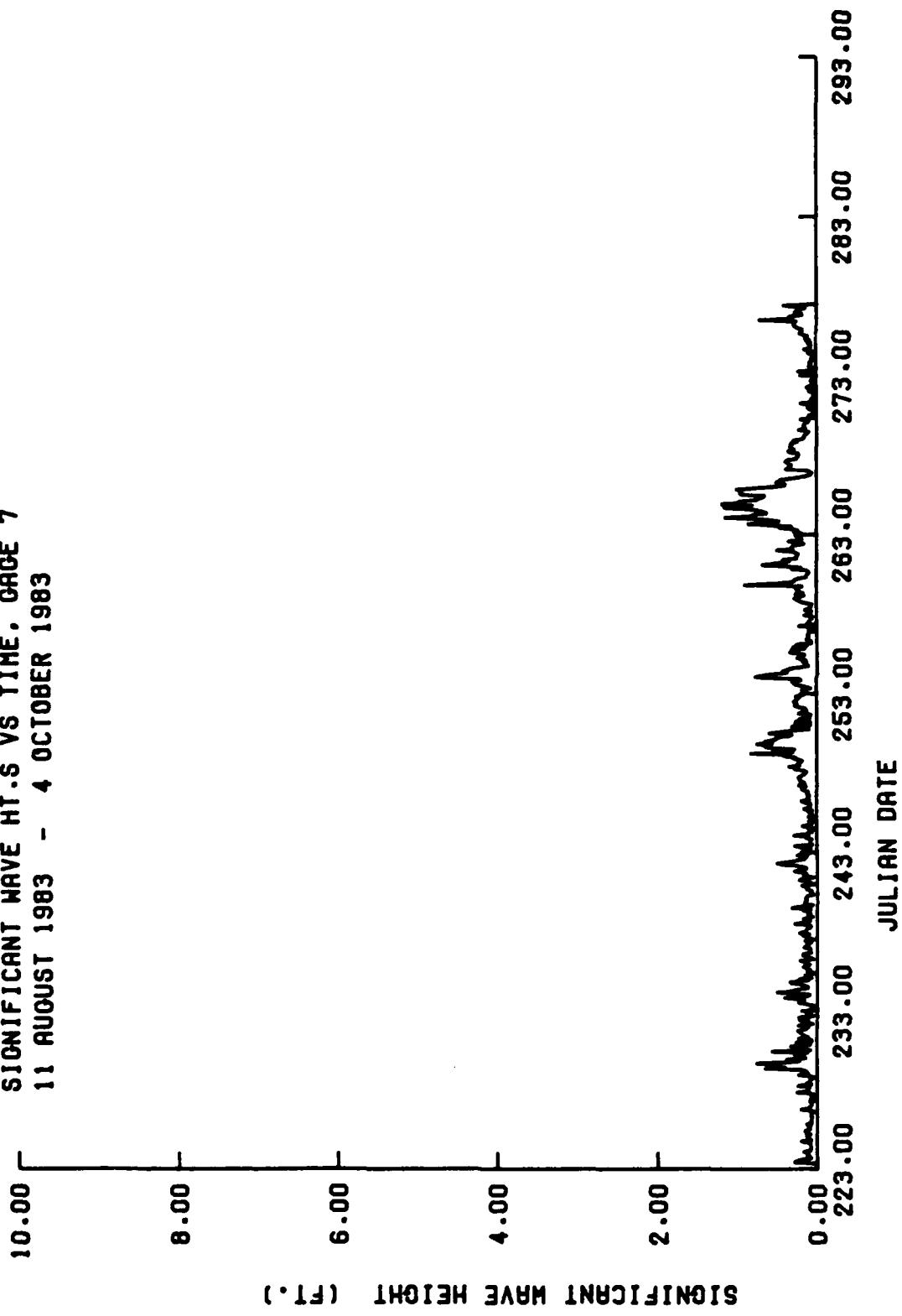


Plate 2

LUDINGTON HARBOR, MICHIGAN  
SIGNIFICANT WAVE HT. VS TIME, GAGE 9  
11 AUGUST 1983 - 4 OCTOBER 1983



LUDINGTON HARBOR, MICHIGAN  
SIGNIFICANT WAVE HT. VS TIME, GRCE 7  
11 AUGUST 1983 - 4 OCTOBER 1983



LUDINGTON HARBOR, MICHIGAN  
SIGNIFICANT WAVE HT. VS TIME, CASE 67  
6 OCTOBER 1983 - 8 DECEMBER 1983

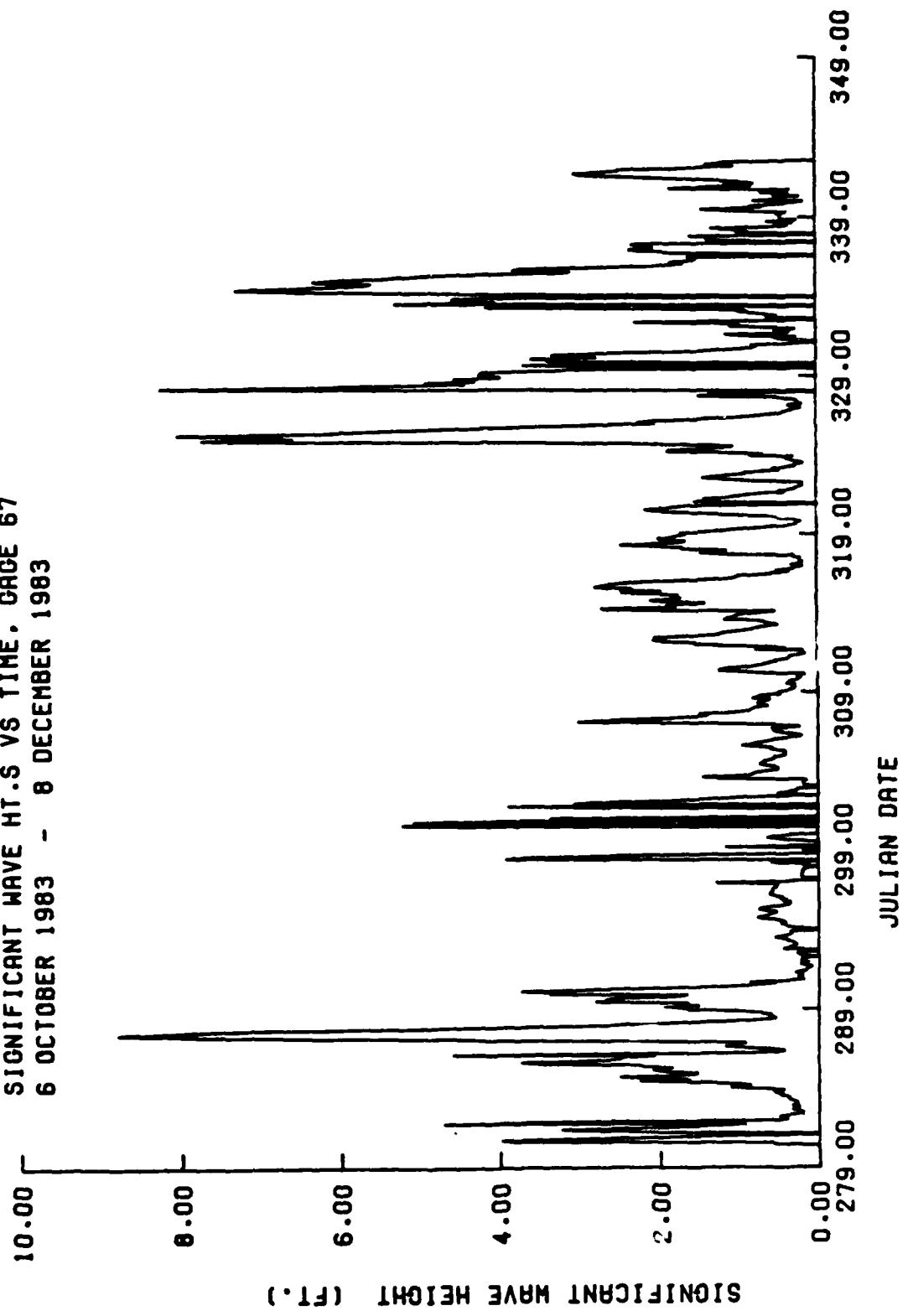
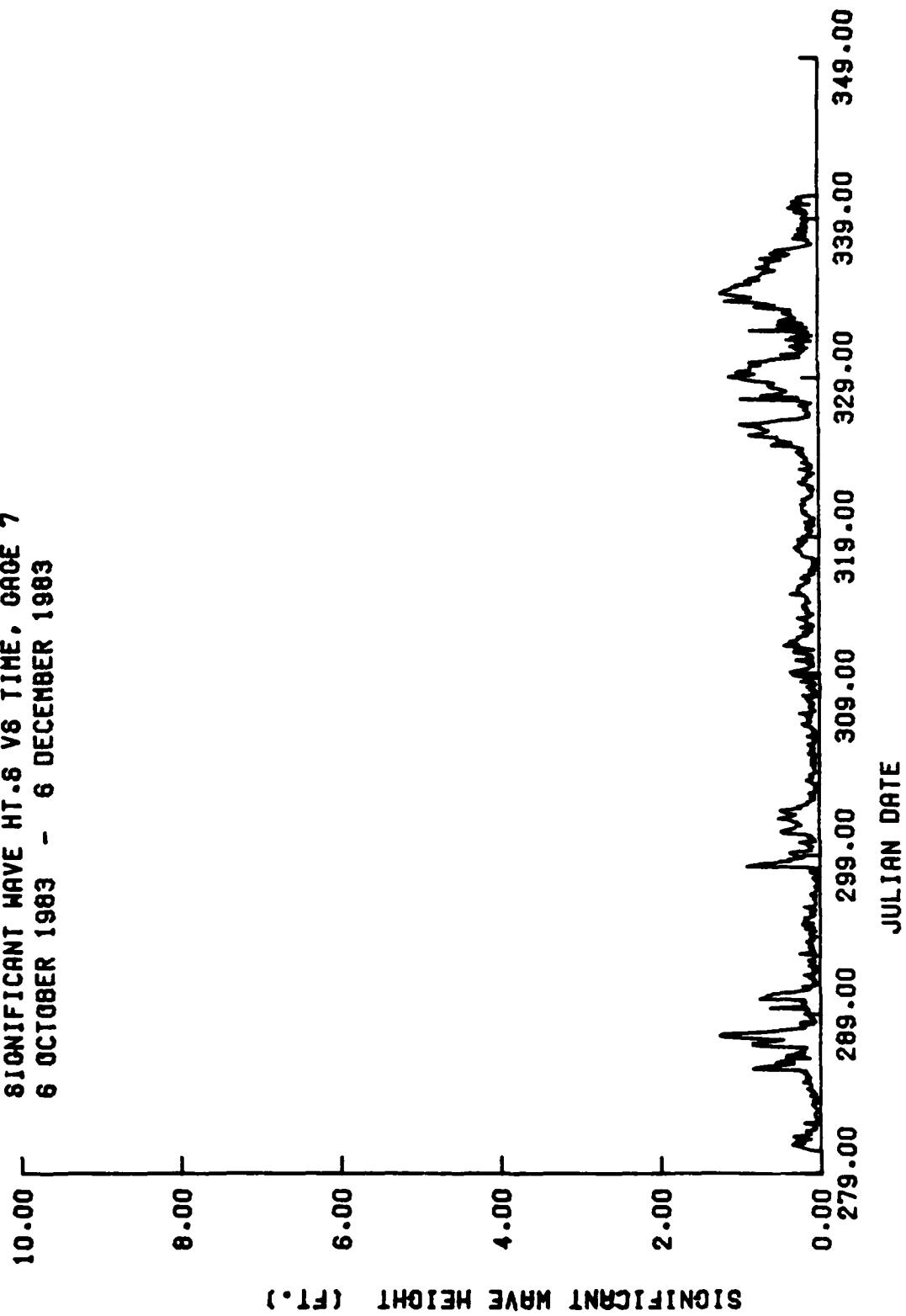


Plate 5

LUDINGTON HARBOR, MICHIGAN  
SIGNIFICANT WAVE HT. VS TIME, CASE 7  
6 OCTOBER 1983 - 6 DECEMBER 1983



## APPENDIX A: WAVE DATA PROCESSING PROCEDURE

### Subsurface Pressure

1. Subsurface pressure under a wave is the summation of two contributing components, dynamic and static pressure, and is quantitatively defined as

$$p' = \rho g \frac{\cosh [2\pi(z + d)/L]}{\cosh (2\pi d/L)} \frac{H}{2} \cos \left[ \frac{2\pi x}{L} - \frac{2\pi t}{T} \right] - \rho g z + p_a \quad (A1)$$

where

$p'$  = total or absolute pressure

$\rho$  = w/g = mass density of water (for saltwater,  $\rho = 2.0$  lb- $\text{sec}^2/\text{ft}^4 = 2.0$  slugs/ $\text{ft}^3$ ; for freshwater,  $\rho = 1.94$  slugs/ $\text{ft}^3$ )

$d$  = water depth

$H$  = wave height

$L$  = wave length

$T$  = wave period

$p_a$  = atmospheric pressure

The first term of Equation A1 represents a dynamic component due to acceleration, while the second term is the static component of pressure. For convenience, the pressure is usually taken as the gage pressure defined as

$$p = p' - p_a = \rho g \frac{\cosh [2\pi(z + d)/L]}{\cosh (2\pi d/L)} \frac{H}{2} \cos \left[ \frac{2\pi x}{L} - \frac{2\pi t}{T} \right] - \rho g z \quad (A2)$$

Equation A2 can be written as

$$p = \rho g n \frac{\cosh [2\pi(z + d)/L]}{\cosh (2\pi d/L)} - \rho g z \quad (A3)$$

2. It is often necessary to determine the height of surface waves based on subsurface measurements of pressure. For this purpose it is convenient to rewrite Equation A3 as

$$\eta = \frac{N(p + \rho g z)}{\rho g K_z} \quad (A4)$$

where

$N$  = correction factor equal to unity if the linear theory applies

$z$  = depth below the still-water level of the pressure gage

$K_z$  = pressure response factor

Several empirical studies have found  $N$  to be a function of period, depth, wave amplitude, and other factors. In general,  $N$  decreases with decreasing period, being greater than 1.0 for long-period waves and less than 1.0 for short-period waves.

3. The pressure response factor  $K_z$  is therefore written as

$$K_z = \frac{\cosh (kh)}{\cosh (kd)} \quad (A5)$$

where

$k$  = local wave number

$h$  = local water depth

$D$  = height of the sensor above the bottom

4. The spectral energy of the sea surface is thus related to the pressure spectrum by the following equation:

$$E_s(f) = \left[ \frac{\cosh (kh)}{\cosh (kd)} \right]^2 E_p(f) \quad (A6)$$

where subscripts  $s$  and  $p$  refer to the surface and pressure spectra, respectively.

5. The significant wave height  $H_s$  is quantitatively defined as

$$H_s = 4 \left[ \int_{1/T}^{1/2\Delta t} E_s(f) df \right]^{1/2}$$

The processed data were smoothed by band averaging eight frequency components of the raw periodogram. The final bandwidth resolution  $B_e$  of the wave

spectra therefore is  $B_e = \frac{8}{1024} = 0.0078$  .

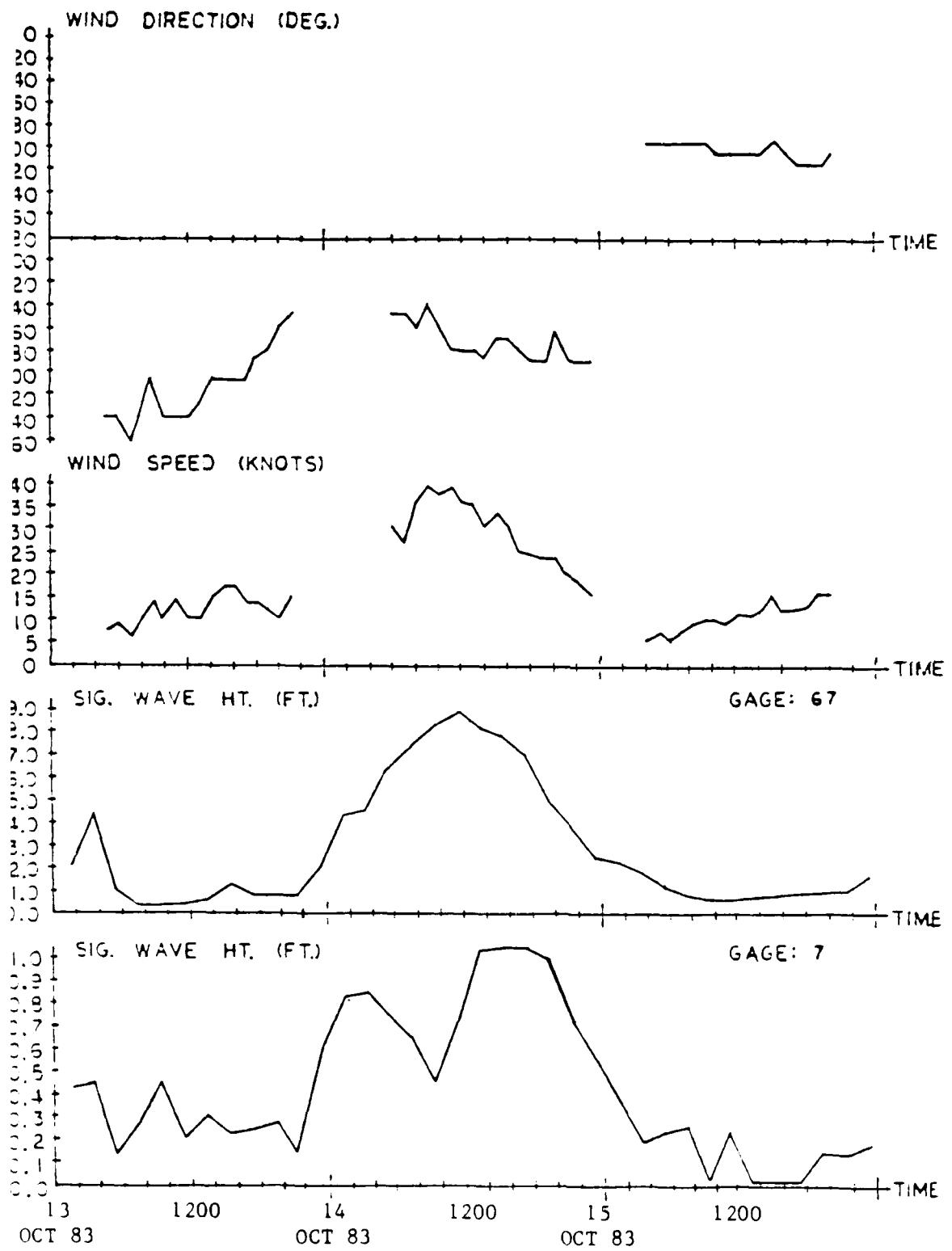
#### Statistical Analysis

6. The wave record data were analyzed to obtain statistical parameters as functions of wave frequency. The statistical analysis output parameters were

- a. Band number - the  $n^{\text{th}}$  band of the wave frequency spectrum.
- b. Wave frequency - the central frequency of each band in the frequency spectrum.
- c. Wave period - the period corresponding to the wave frequency.
- d. Valid observations - the term "valid" means that the wave record contained 20 or fewer bad pressure samples.
- e. Percent of valid records - the quantity of valid observations compared to the total quantity of wave records.
- f. Probable maximum wave height - the probable height of the highest wave predicted by the Rayleigh Wave Height probability distribution, a height ratio of 1.87.

## APPENDIX B: WAVE DATA SUMMARY

1. This Appendix presents a summary of wave data. Pages B2, B25, B51, and B62 present wind speed, wind direction, and significant wave height data plots for (a) 13 October 1983 - 15 October 1983, (b) 20 November 1983 - 22 November 1983, (c) 24 November 1983 - 26 November 1983, and (d) 29 November 1983 - 1 December 1983, respectively. Corresponding spectral plots are presented for time periods (a), (b), (c), and (d) on the following pages: (a) pages B3-B24, (b) pages B26-B50, (c) pages B52-B61, and (d) pages B63-B82.



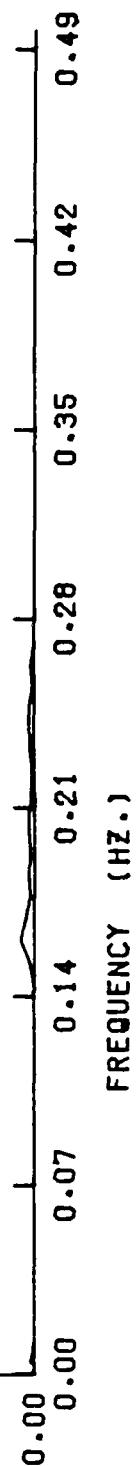
LOGBOOK "WAVE ENERGY DENSITY VS FREQUENCY, GAGE 7"

DATE 287 TIME 1330 SIG. HT. 1.18 ft. PER. 6.23 sec.

SPECTRAL PEAKS

Frequency	Peak	Period	Energy Density
-----------	------	--------	----------------

.004	227.556	.401
.059	16.926	.001
.067	14.949	.001
.161	6.225	1.826
.184	5.432	.808
.200	5.007	.706
.247	4.055	.700
.262	3.814	.461

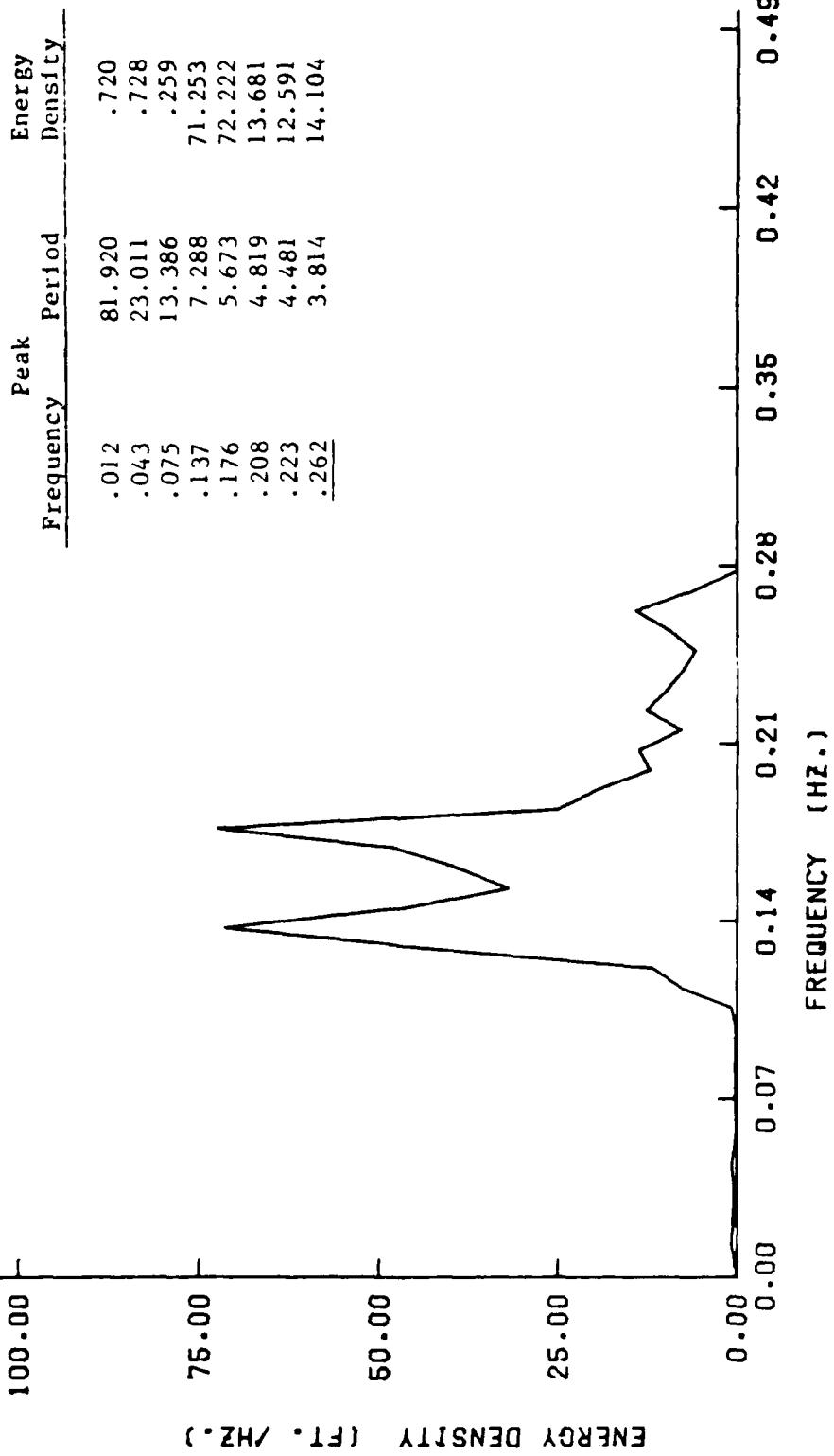


126.00  
100.00  
76.00  
50.00  
25.00  
0.00

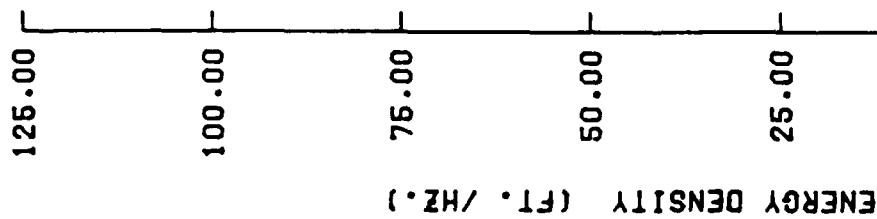
ENERGY DENSITY (FFT. /Hz.)

LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GAGE 67  
DATE 28/ TIME 1330 SIG. HT. 8.06 ft PER. 5.67 sec.

SPECTRAL PEAKS



LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GAGE 7  
DATE 28/ TIME 1110 SIG. HT. 0.74 FT. PER. 5.94 SEC.

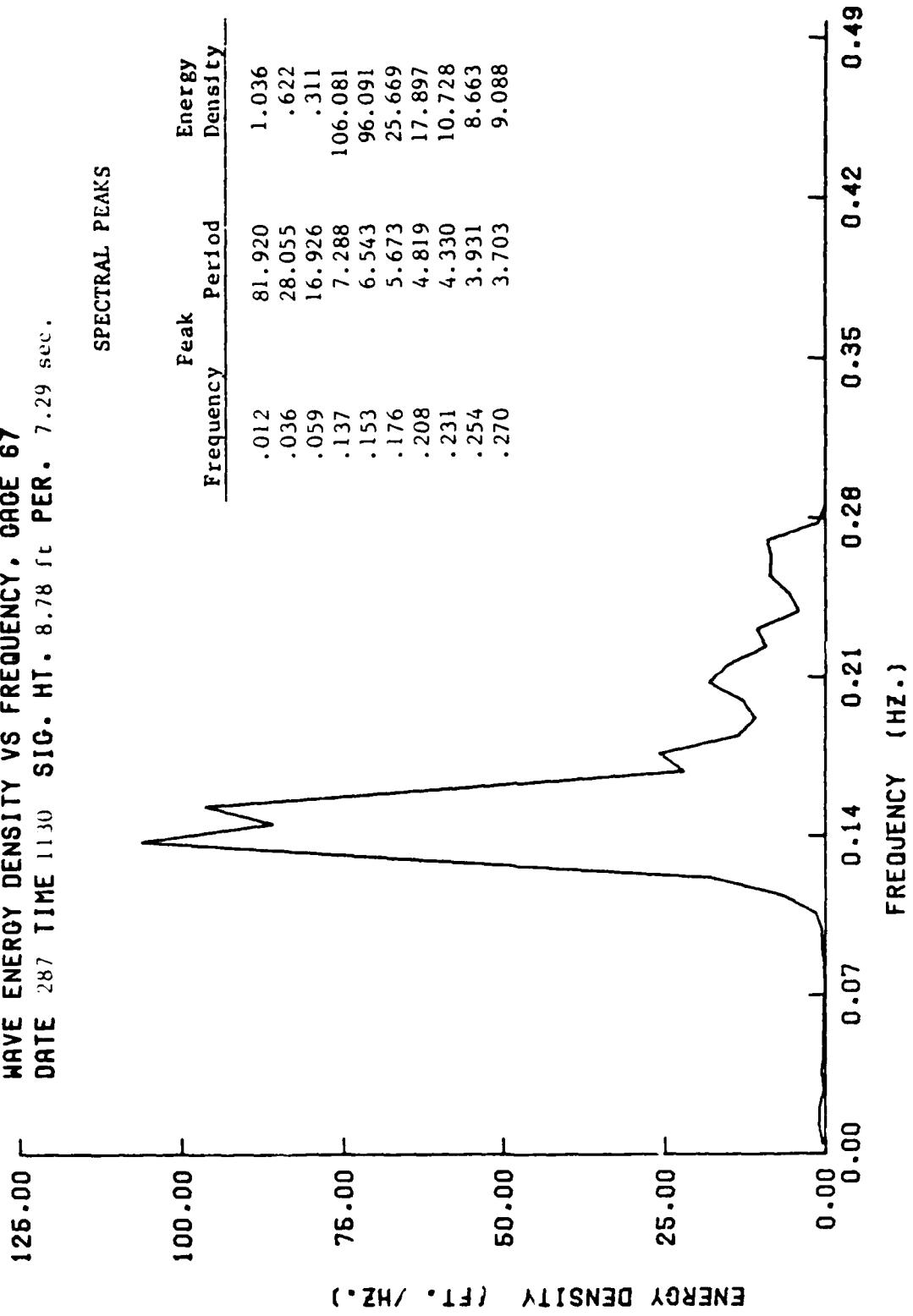


SPECTRAL PEAKS

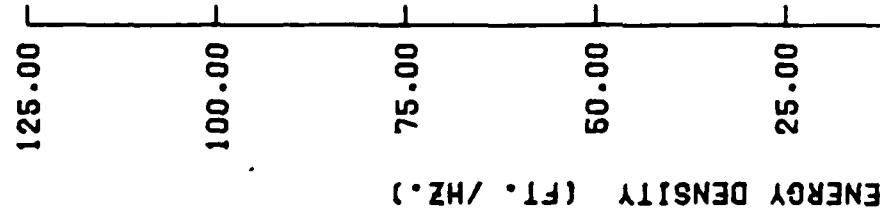
	Peak Frequency	Period	Energy Density
	.004	227.556	.505
	.106	9.438	.002
	.168	5.936	.631
	.192	5.211	.552
	.239	4.188	.118

LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY, GAGE 67  
DATE 287 TIME 1130 SIG. HT. 8.78 ft PER. 7.29 sec.

SPECTRAL PEAKS



LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY, GRADE 7  
DATE 28/7 TIME 0930 SIG. HT. 0.47 ft. PER. 5.21 sec.

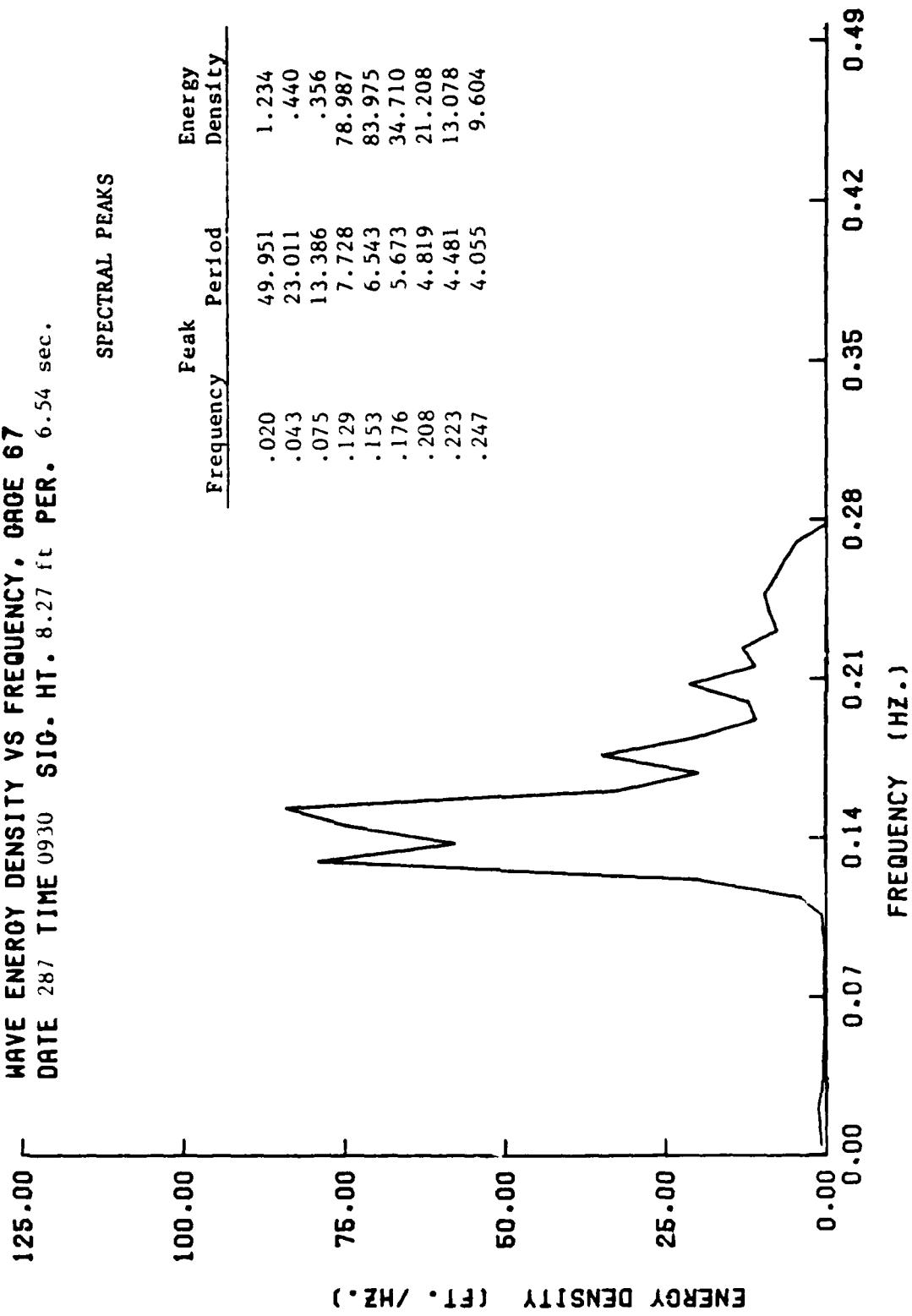


SPECTRAL PEAKS

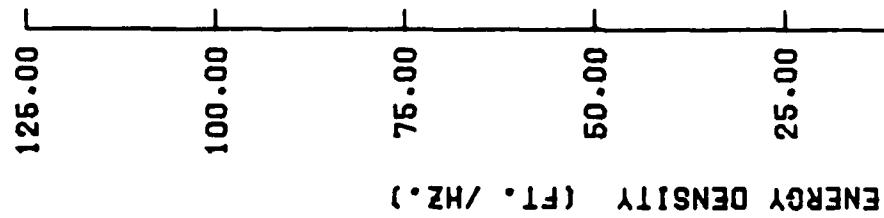
Frequency	Peak	Period	Energy Density
.004		227.556	.107
.059		16.926	.002
.145		6.896	.049
.168		5.936	.180
.192		5.211	.233
.254		3.931	.099

ENERGY DENSITY CURVE COINCIDES  
WITH FREQUENCY AXIS

LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GRADE 67  
DATE 28/7 TIME 0930 SIG. HT. 8.27 ft PER. 6.54 sec.



LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GAGE 7  
DATE 287 TIME 0730 610. HT. 0.63 ft. PER. 5.01 sec.

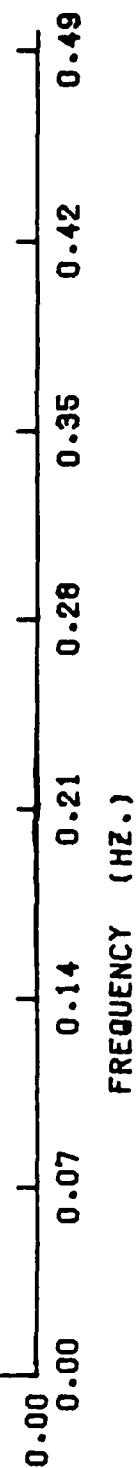


SPECTRAL PEAKS

<u>Frequency</u>	<u>Peak</u>	<u>Period</u>	<u>Energy</u>	<u>Density</u>
.004	227.556		.131	
.051	19.505		.002	
.059	16.926		.002	
.168	5.936		.214	
.184	5.432		.274	
.200	5.007		.409	
.223	4.481		.356	
.239	4.188		.160	
<u>.262</u>	<u>3.814</u>		<u>.068</u>	

ENERGY DENSITY CURVE COINCIDES  
WITH FREQUENCY AXIS

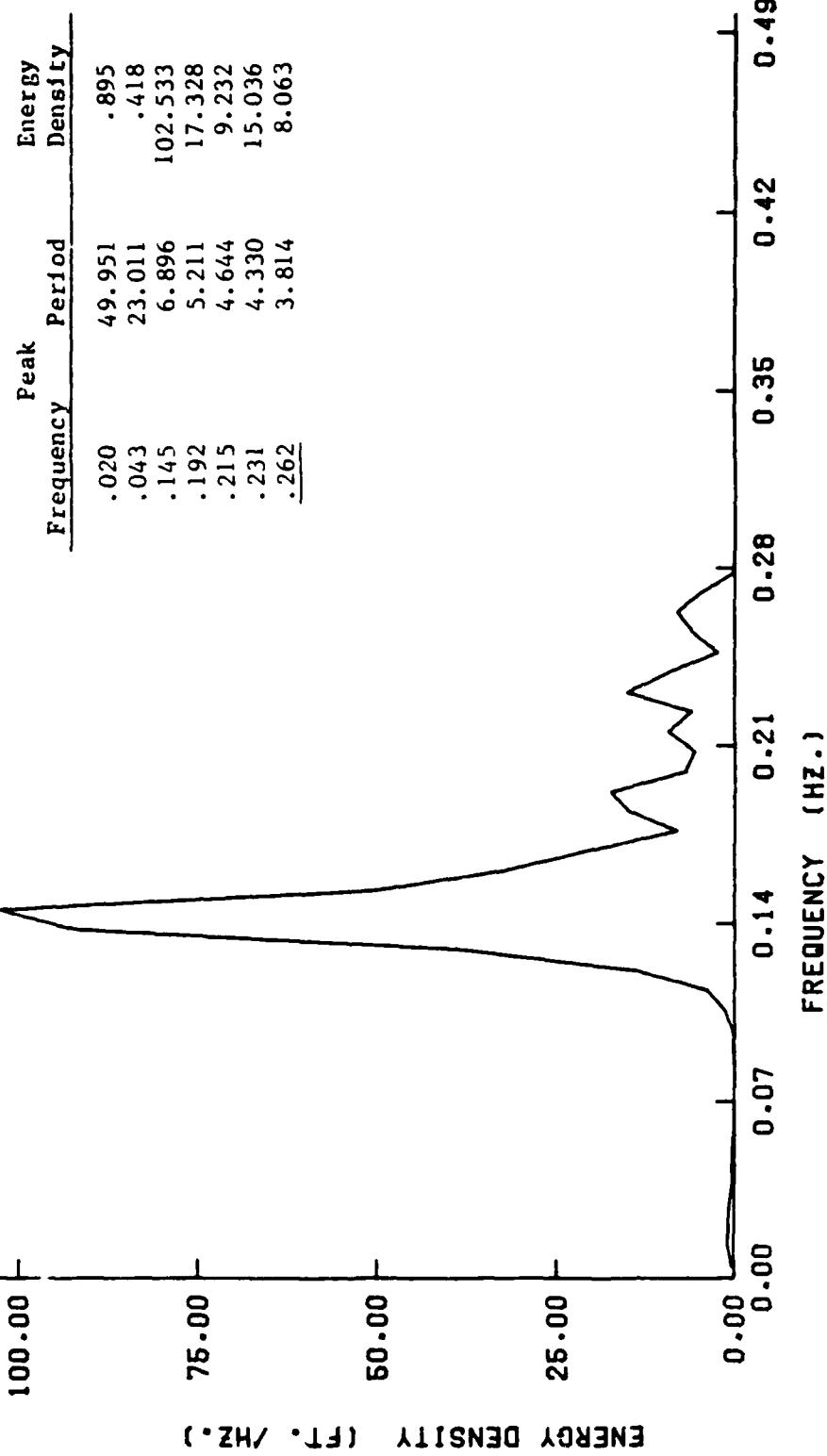
B10



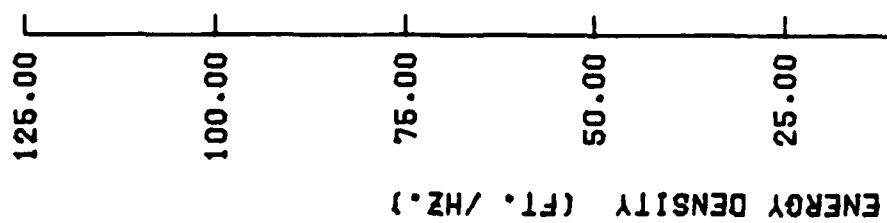
FREQUENCY (HZ.)

LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY, GAGE 67  
DATE 28/7 TIME 0730 SIG. HT. 7.69 ft PER. 6.90 sec.

SPECTRAL PEAKS



LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. DRAKE 7  
DATE 287 TIME 0530 S10. HT. 0.75 ft. PER. 227.56 sec.

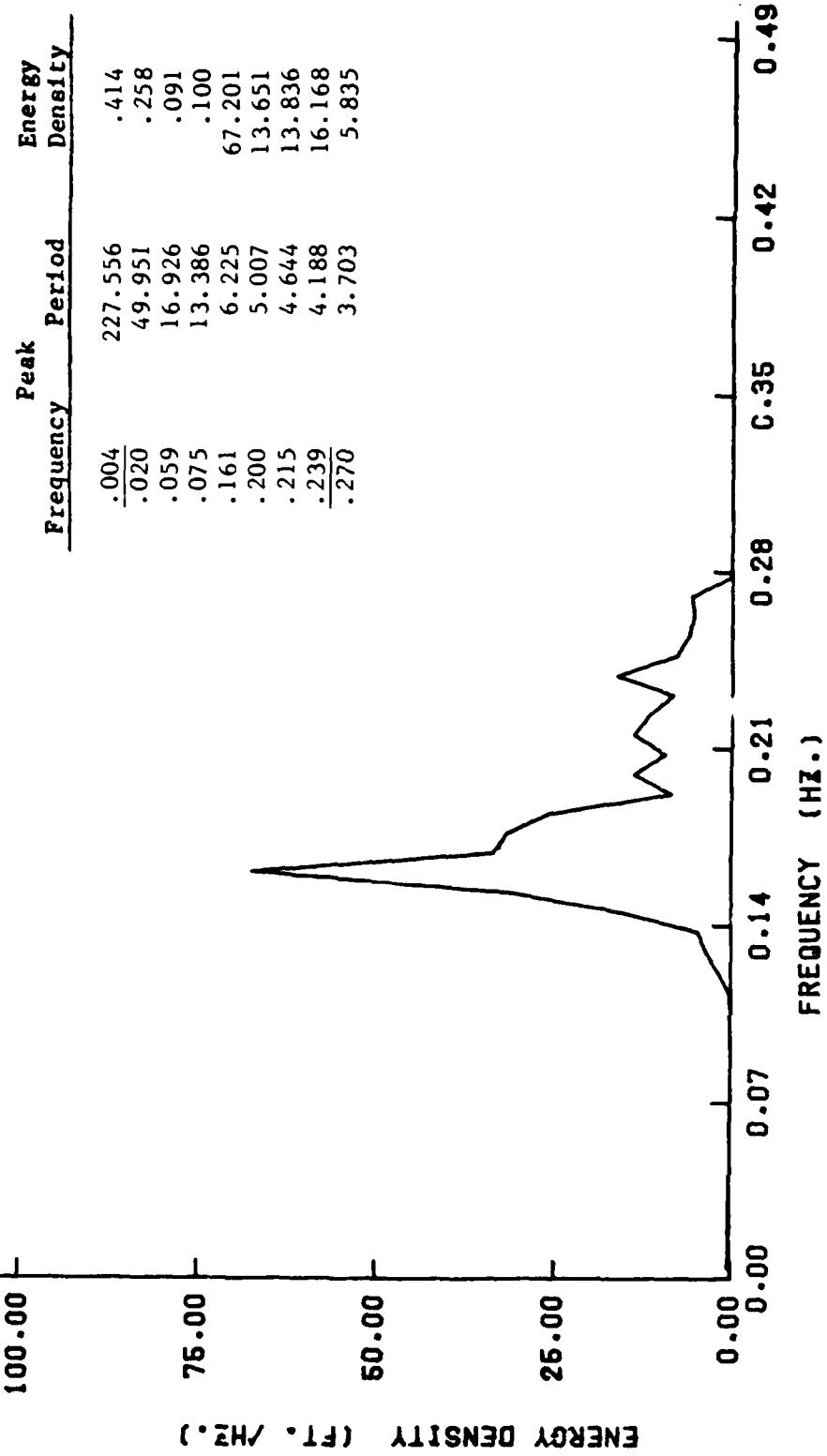


SPECTRAL PEAKS

Frequency	Peak Period	Energy Density
.004	227.556	1.356
.168	5.936	1.115
.192	5.211	.133
.239	4.188	.054
.254	3.931	.029

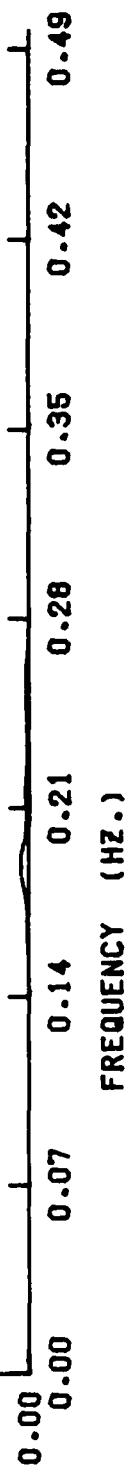
LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. DATE 67  
DATE 287 TIME 0530 SIG. HT. 6.36 ft PER. 6.23 sec.

SPECTRAL PEAKS

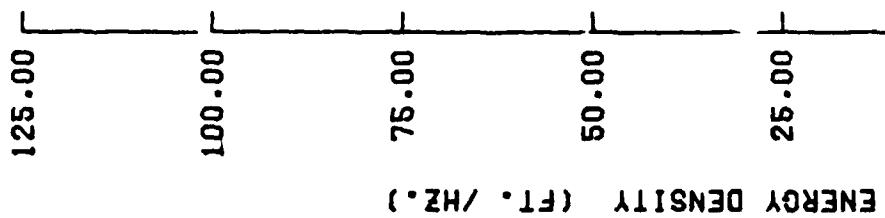


LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. WAVE 7  
DATE 287 TIME 0330 SIG. HT. 0.85 ft PER. 5.21 sec.

SPECTRAL PEAKS



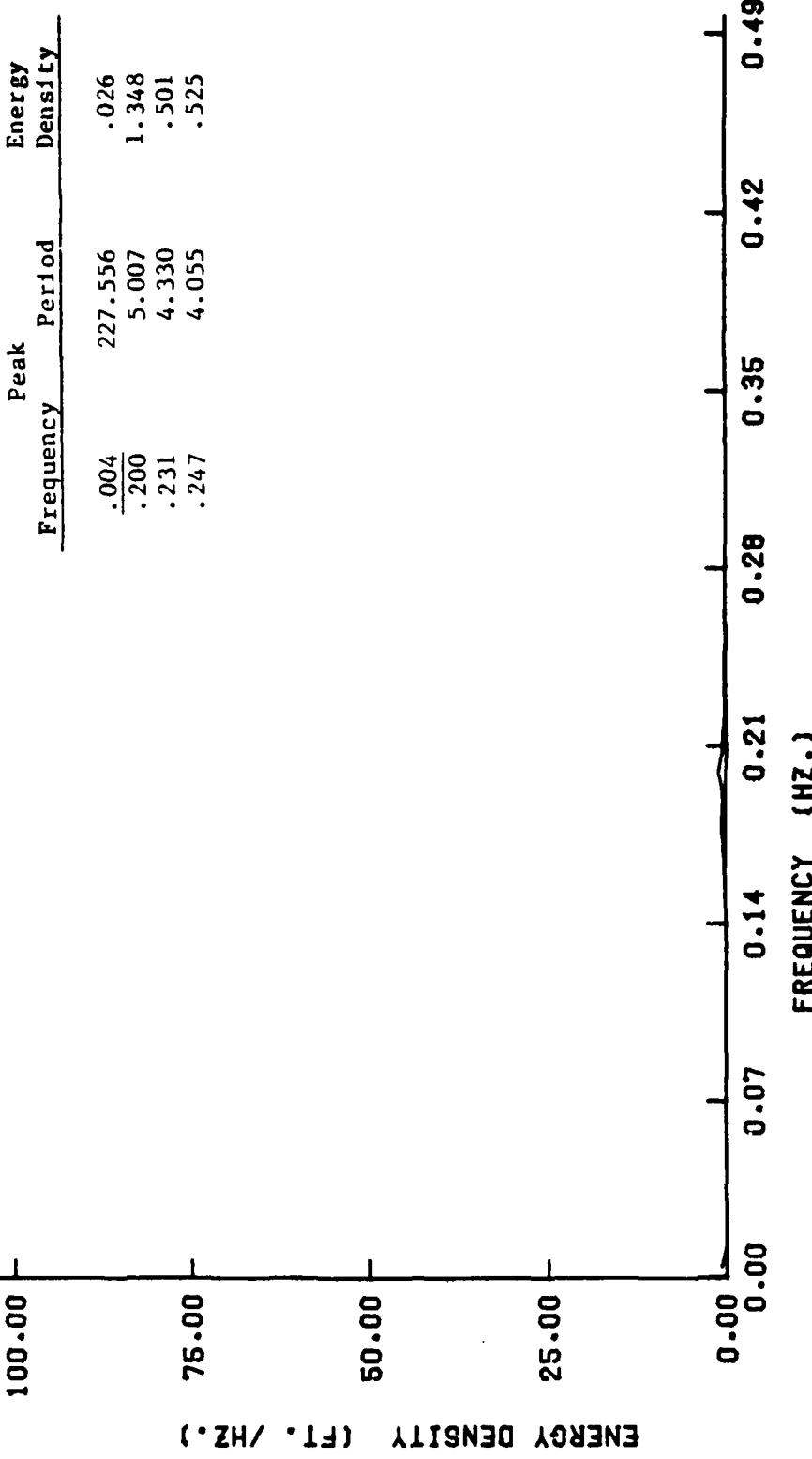
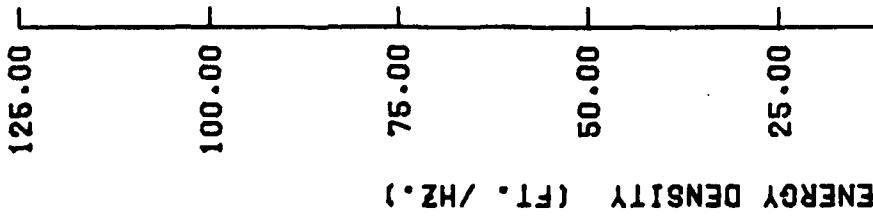
LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY, GAGE 67  
DATE 287 TIME 0330 SIG. HT. 4.49 ft PER. 5.43 sec.



SPECTRAL PEAKS

Peak Frequency	Period	Energy Density
.004	227.556	.277
<u>.028</u>	35.930	.087
.051	19.505	.059
.083	12.118	.023
.098	10.189	.029
.168	5.936	16.300
.184	5.432	27.737
.223	4.481	8.044
<u>.262</u>	3.814	5.098

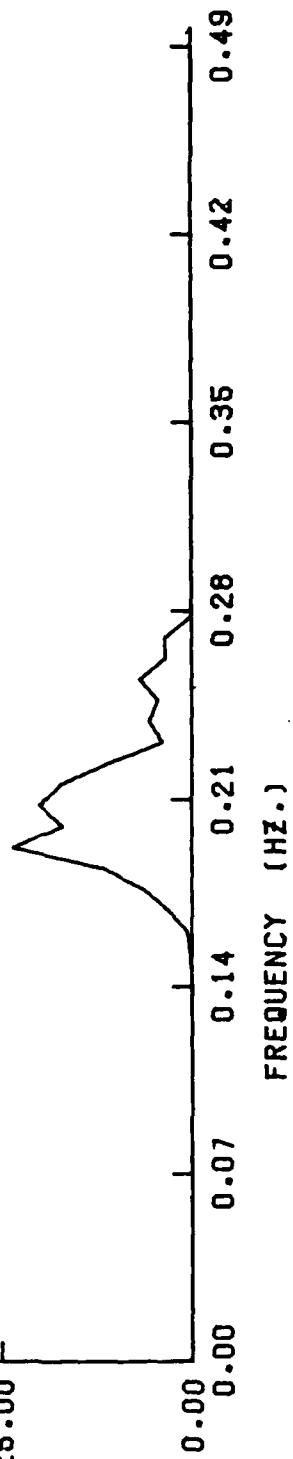
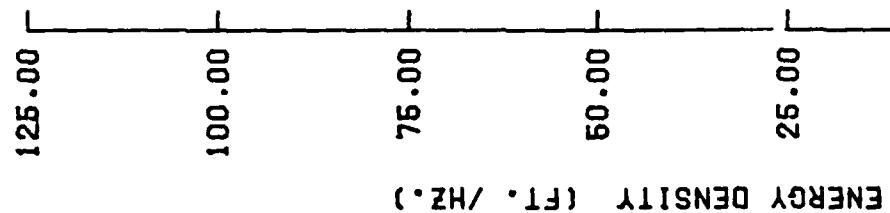
LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY, GAGE 7  
DATE 287 TIME 0130 SIG. HT. 0.85 ft-PER. 5.01 sec.



LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY, GAGE 67  
DATE 287 TIME 0130 SIG. HT. 4.16 ft PER. 5.21 sec.

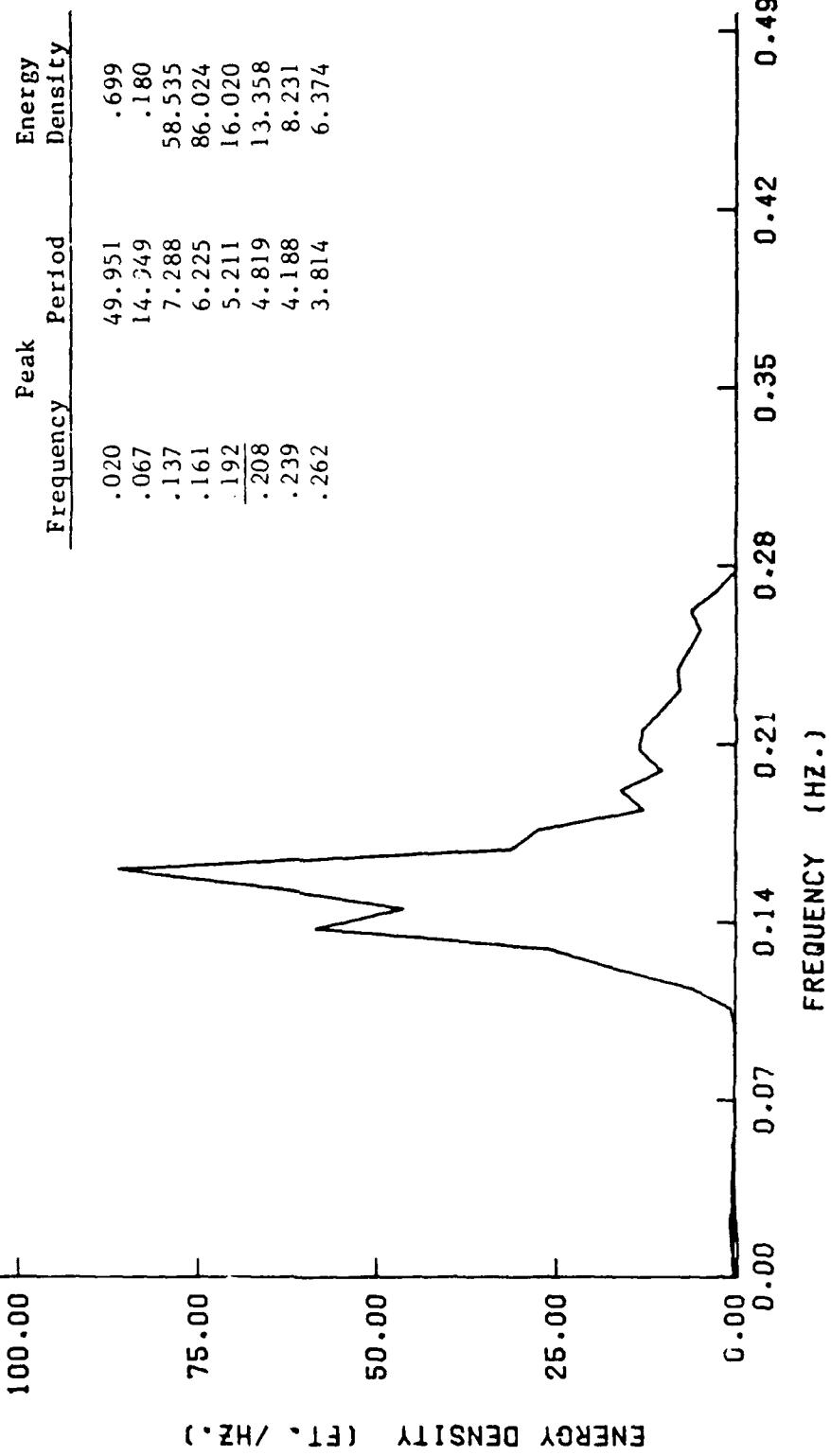
SPECTRAL PEAKS

	Peak Frequency	Period	Energy Density
	.004	227.556	.016
	.020	49.951	.055
	.051	19.505	.033
	.192	5.211	23.396
	.208	4.819	19.867
	.239	4.188	5.575
	.254	3.931	6.805
	.270	3.703	3.496

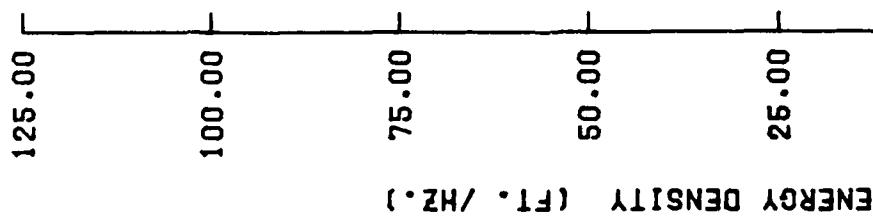


LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY, GAGE 67  
DATE 28/ TIME 1530 SIG. HT. 7.74 ft PER. 6.23 sec.

SPECTRAL PEAKS



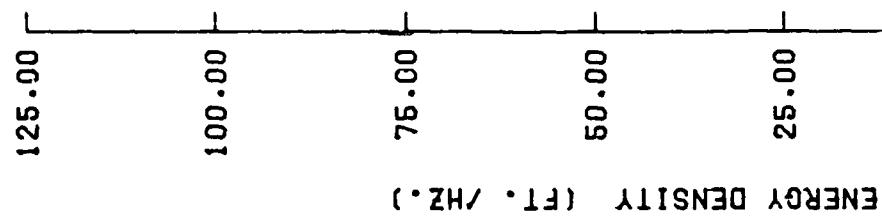
LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY, GAGE 7  
DATE 28/ TIME 1530 SIG. HT. 1.26 ft. PER. 5.94 sec.



SPECTRAL PEAKS

Frequency	Peak	Period	Energy density
.004	227.556		.218
.168	5.936		1.406
.192	5.211		.789
.215	4.644		1.180
.231	4.330		.662
.247	4.055		.654

LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GAGE 67  
DATE 18/ TIME 1730 SIG. HT. 6.94 ft PER. 6.23 sec.

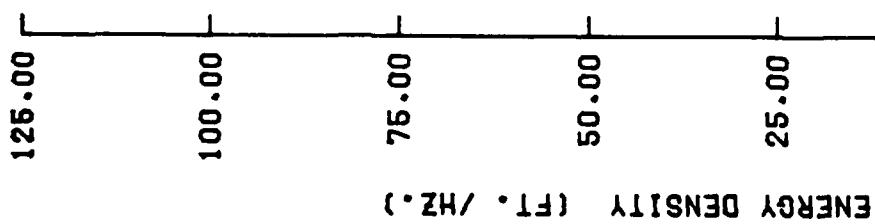


SPECTRAL PEAKS

Peak Frequency	Period	Energy Density
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.012	81.920	.471
.051	19.505	.192
.067	14.949	.072
.161	6.225	73.769
.192	5.211	29.796
.208	4.819	17.456
<u>.239</u>	4.188	8.150
<u>.254</u>	3.931	6.908
<u>.270</u>	3.703	5.861

LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. QAQE 7  
DATE 287 TIME 1730 SIG. HT. 1.24 ft. PER. 5.94 sec.



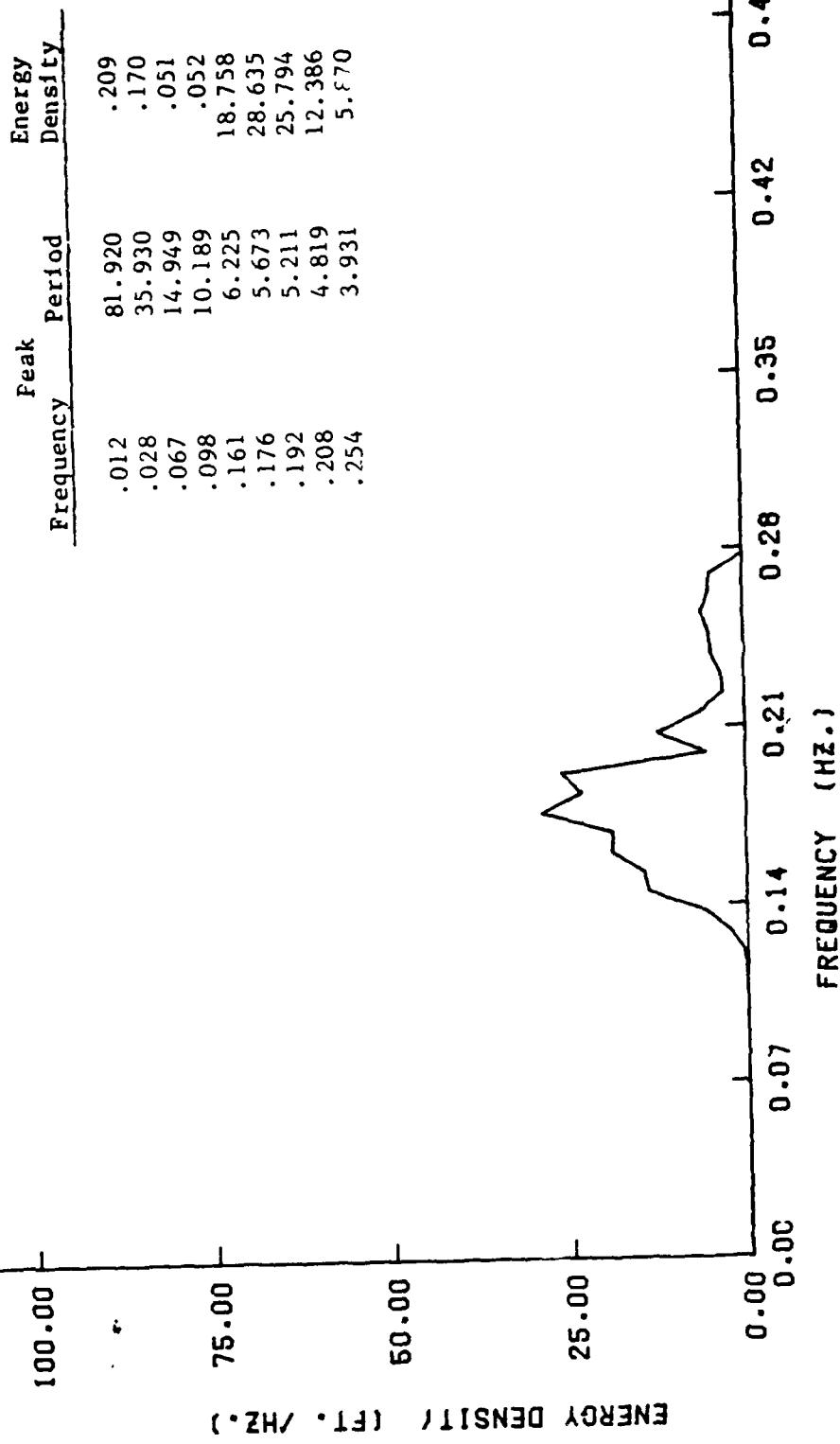
SPECTRAL PEAKS

Frequency	Peak Period	Energy Density
.004	227.556	.242
.168	5.936	2.109
.184	5.432	.700
.208	4.819	.844
<u>.239</u>	4.188	.505
<u>.254</u>	3.931	.630

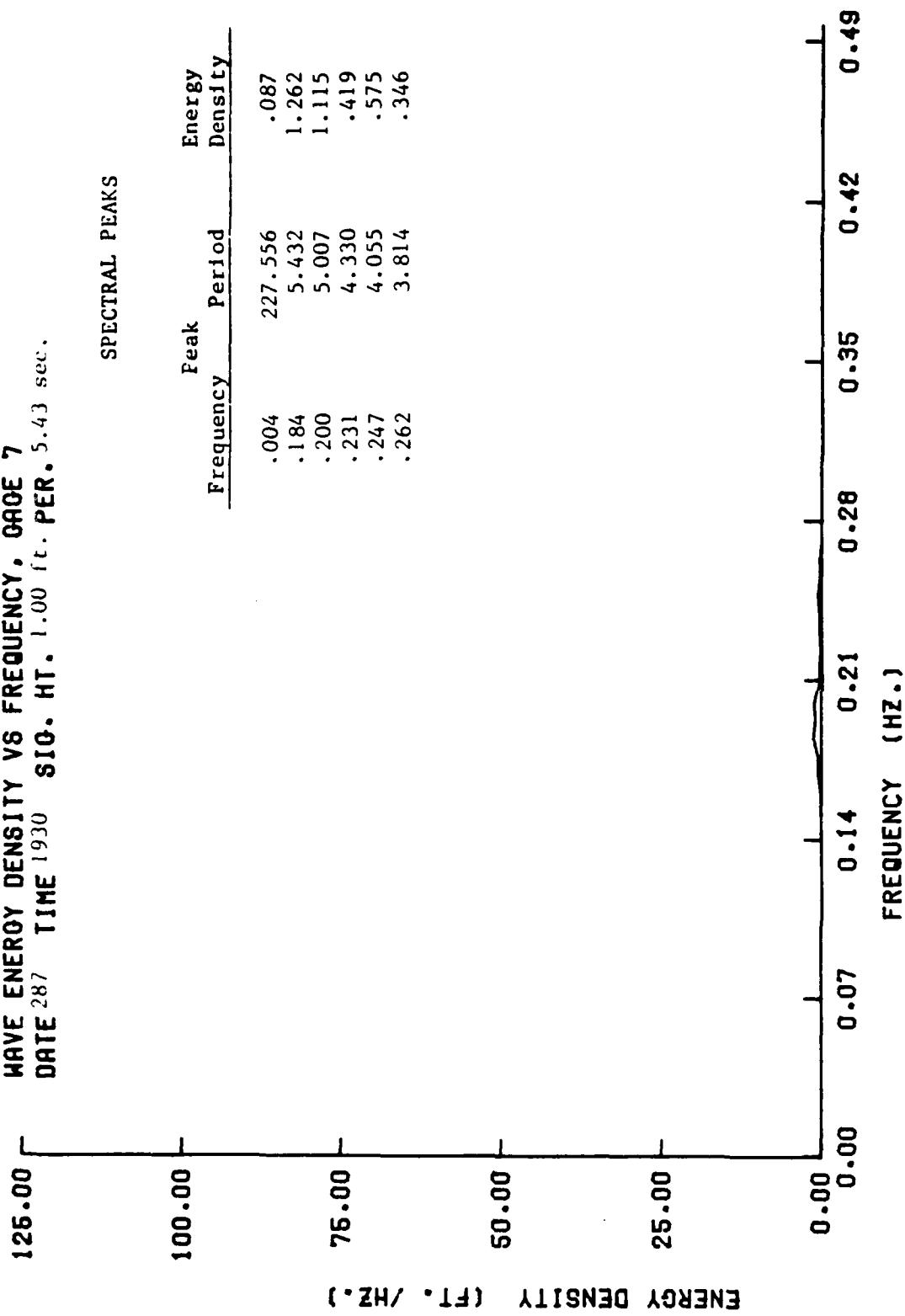


LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GAGE 67  
DATE 287 TIME 1930 SIG. HT. 5.11 ft PER. 5.67 sec.

SPECTRAL PEAKS

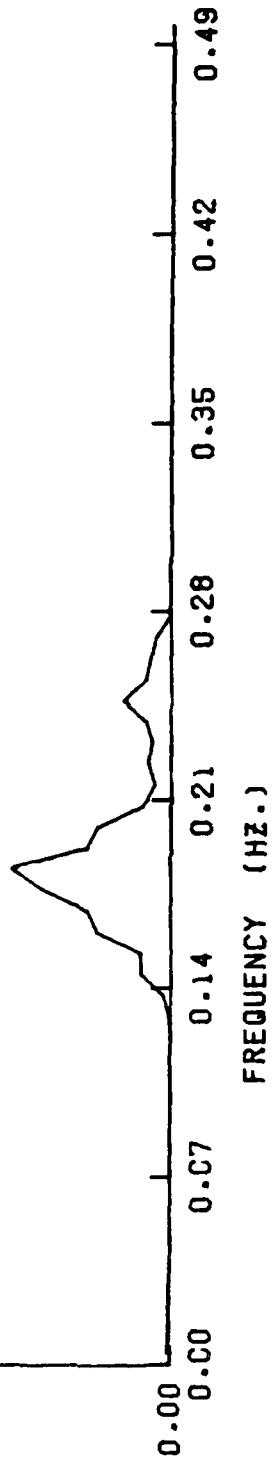


LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY, GRADE 7  
DATE 287 TIME 1930 SIG. HT. 1.00 ft. PER. 5.43 sec.

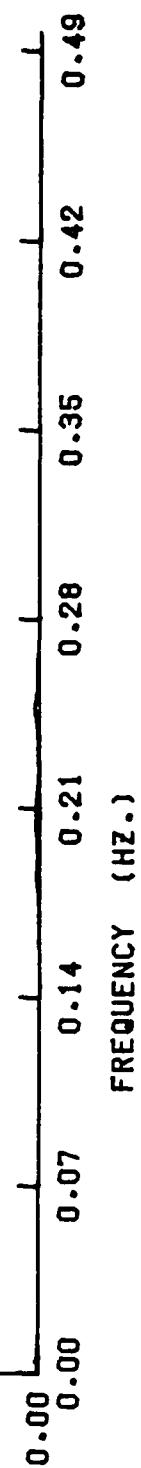
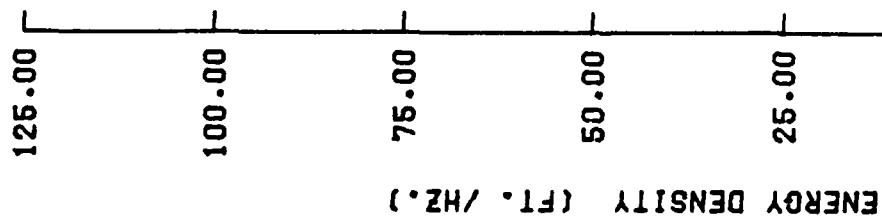


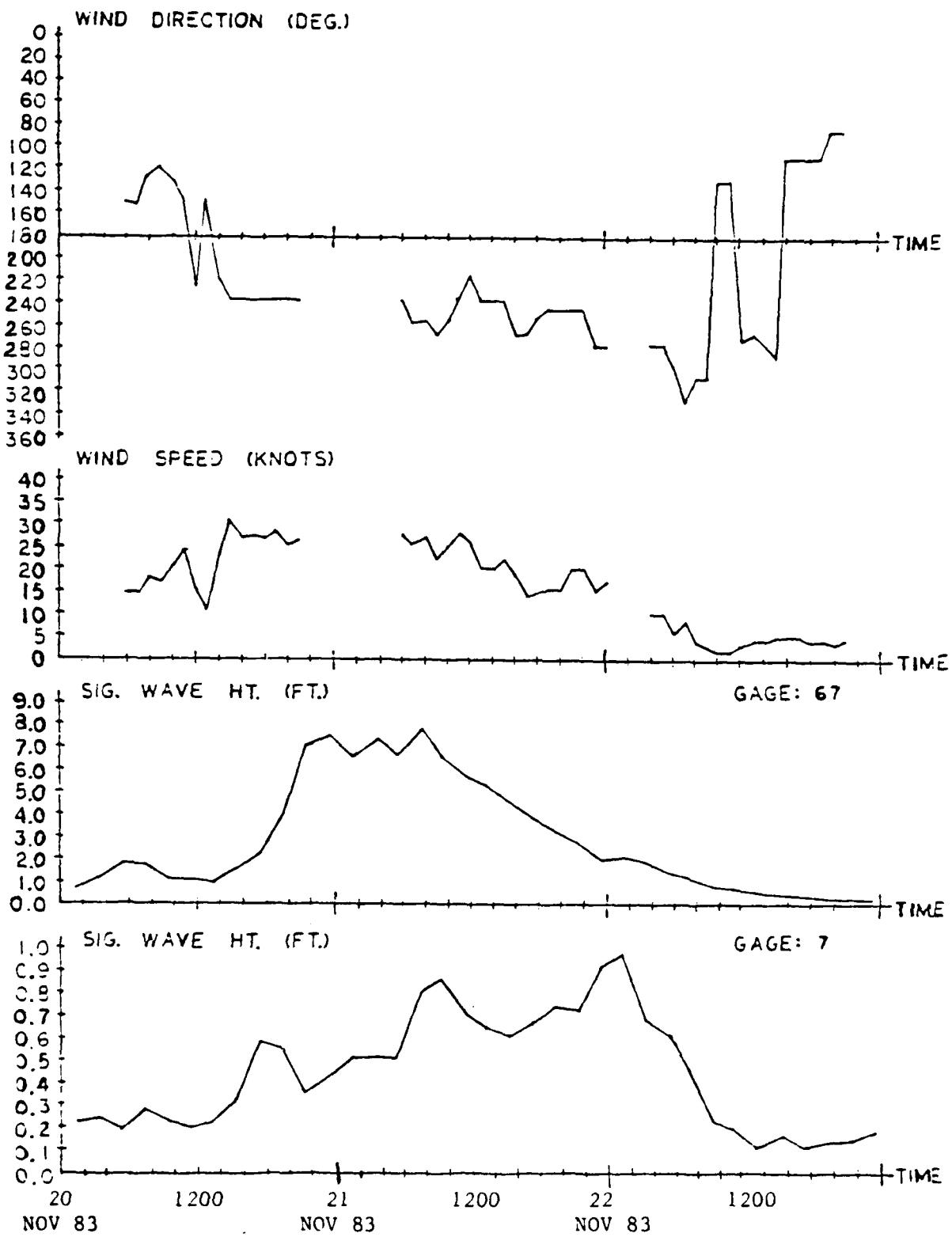
LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY, GAGE 67  
DATE 28/ TIME 2130 SIG. HT. 3.83 ft PER. 5.43 sec.

SPECTRAL PEAKS



LUODINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY, GAGE 7  
DATE 287 TIME 2130 SIG. HT. 0.70 ft. PER 4.06 sec.



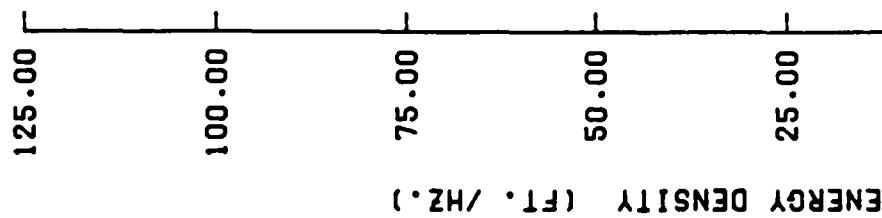


LUDINGTON HARBOR, MICHIGAN

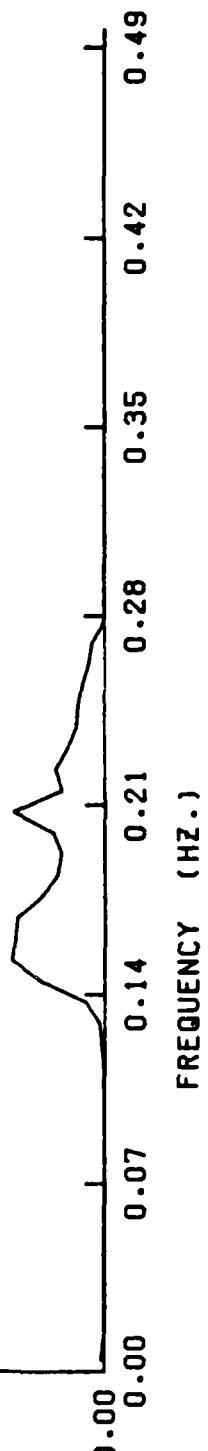
WAVE ENERGY DENSITY VS FREQUENCY. GAGE 67

DATE 3/24 TIME 1930 SIG. HT. 3.83 ft. PER. 6.54 sec.

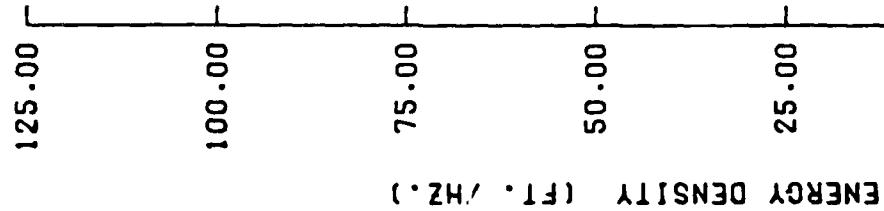
SPECTRAL PEAKS



Peak Frequency	Period	Energy Density
.004	227.556	.427
<u>.020</u>	49.951	.111
<u>.043</u>	23.011	.154
<u>.059</u>	16.926	.079
<u>.153</u>	6.543	12.094
<u>.208</u>	4.819	11.967
<u>.223</u>	4.481	6.357



LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY, GAGE 7  
DATE 324 TIME 1930 SIG. HT. 0.56 ft. PER. 5.43 sec.



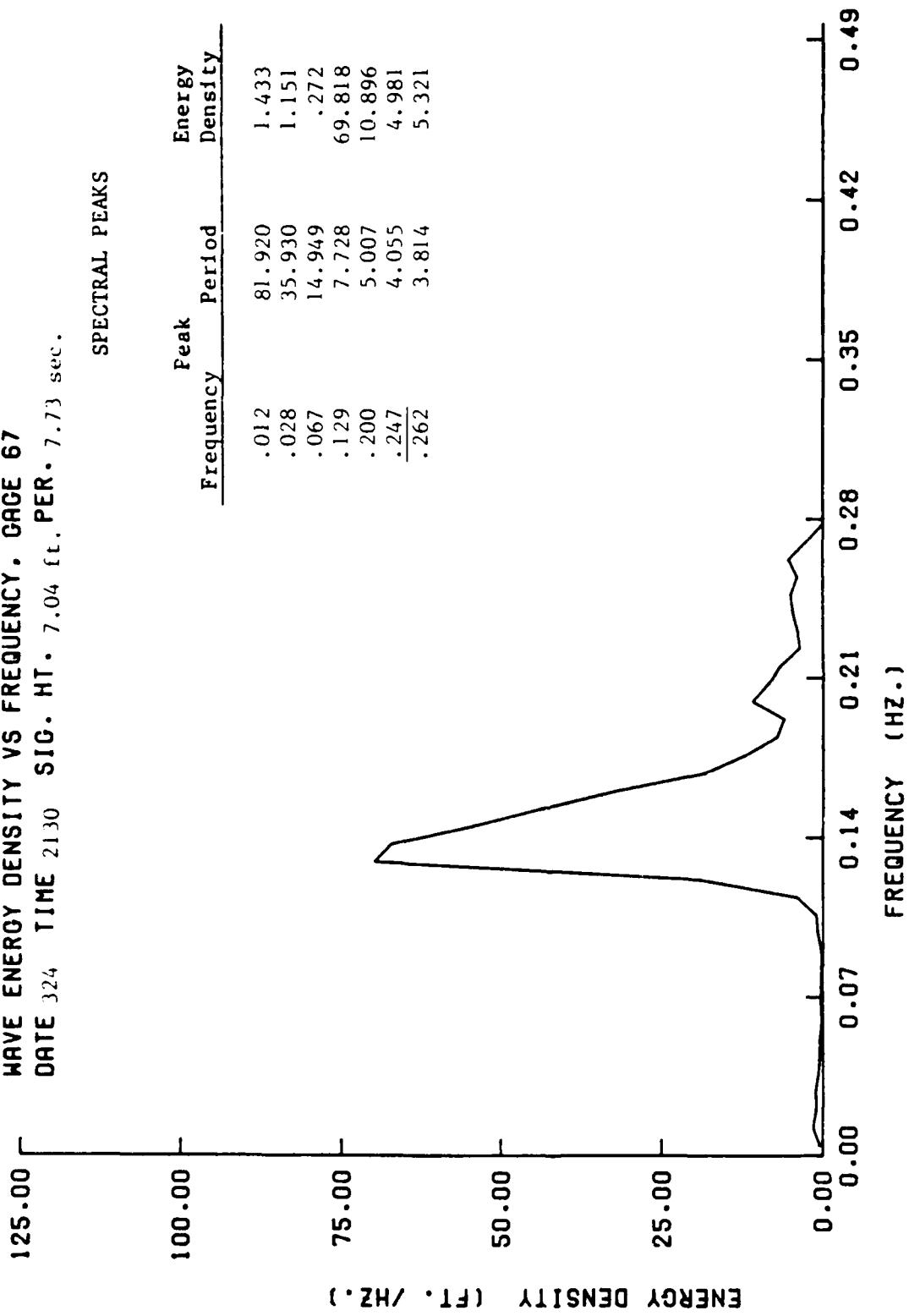
SPECTRAL PEAKS

Frequency	Peak Period	Energy Density
.004	227.556	.253
.020	49.951	.082
.059	16.926	.003
.067	14.949	.003
.090	11.070	.003
.106	9.438	.004
.137	7.288	.059
.168	5.936	.184
.184	5.432	.360
.208	4.819	.260
.247	4.055	.144

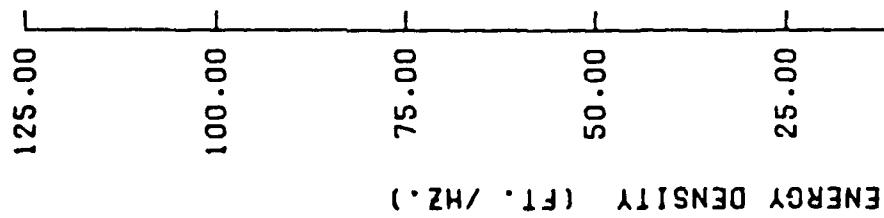
ENERGY DENSITY CURVE COINCIDES  
WITH FREQUENCY AXIS

LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GAGE 67  
DATE 3/24 TIME 2130 SIG. HT. 7.04 ft. PER. 7.73 sec.

SPECTRAL PEAKS



LUOINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY, GAGE 7  
DATE 3/24 TIME 2130 SIG. HT. 0.35 ft. PER. 5.21 sec.



SPECTRAL PEAKS

Frequency	Peak	Period	Energy Density
.004		227.556	.074
.059		16.926	.004
.137		7.288	.018
.161		6.225	.037
.192		5.211	.188
.247		4.055	.072

ENERGY DENSITY CURVE COINCIDES  
WITH FREQUENCY AXIS

DATE 324 TIME 2330 SIG. HI. 7.69 ft. PER. 8.23 sec.

125.00

100.00

75.00

50.00

25.00

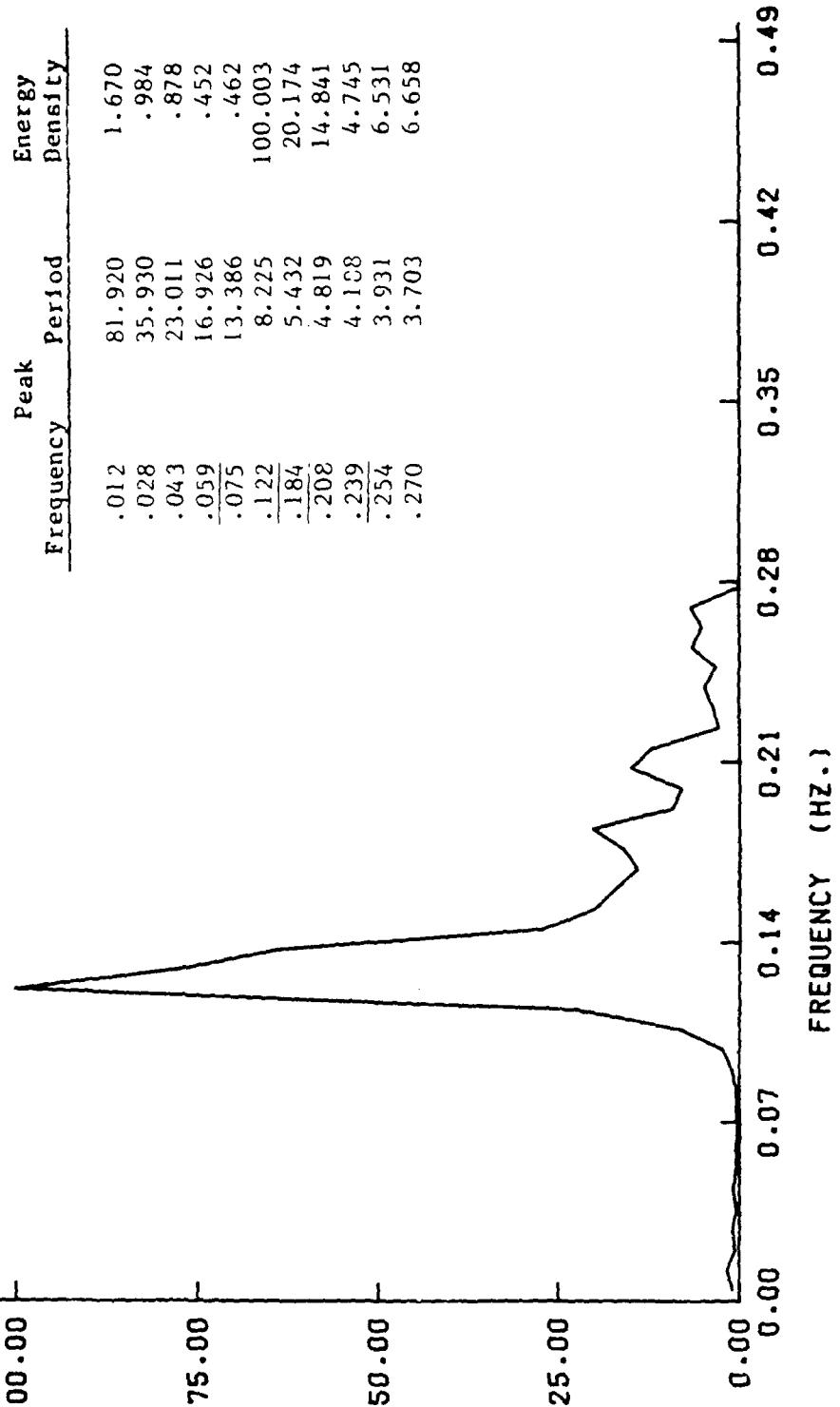
0.00

ENERGY DENSITY (FT. /HZ.)

SPECTRAL PEAKS

Peak Frequency	Period	Energy Density
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.012	81.920	1.670
.028	35.930	.984
.043	23.011	.878
<u>.059</u>	16.926	.452
<u>.075</u>	13.386	.462
.122	8.225	100.003
<u>.184</u>	5.432	20.174
<u>.208</u>	4.819	14.841
.239	4.108	4.745
<u>.254</u>	3.931	6.531
.270	3.703	6.658



RD-R157 074

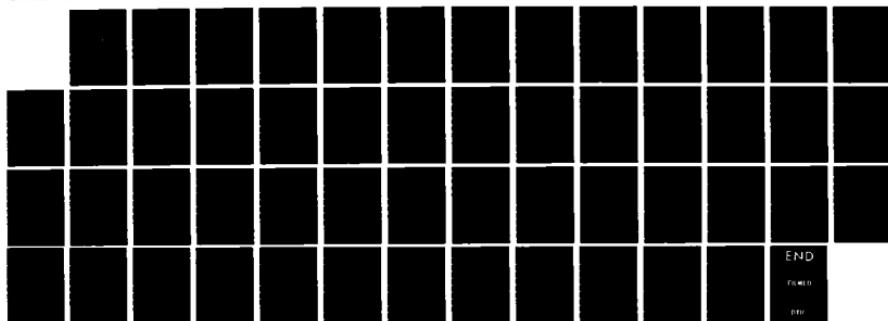
WAVE CLIMATOLOGY STUDY FOR LUDINGTON HARBOR MICHIGAN  
(U) COASTAL ENGINEERING RESEARCH CENTER VICKSBURG MS  
G M HORSHAM JUN 85 CERC-85-7

2/2

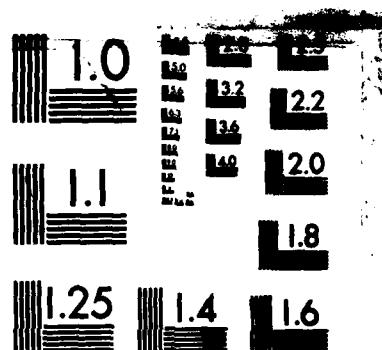
UNCLASSIFIED

F/G 8/8

NL

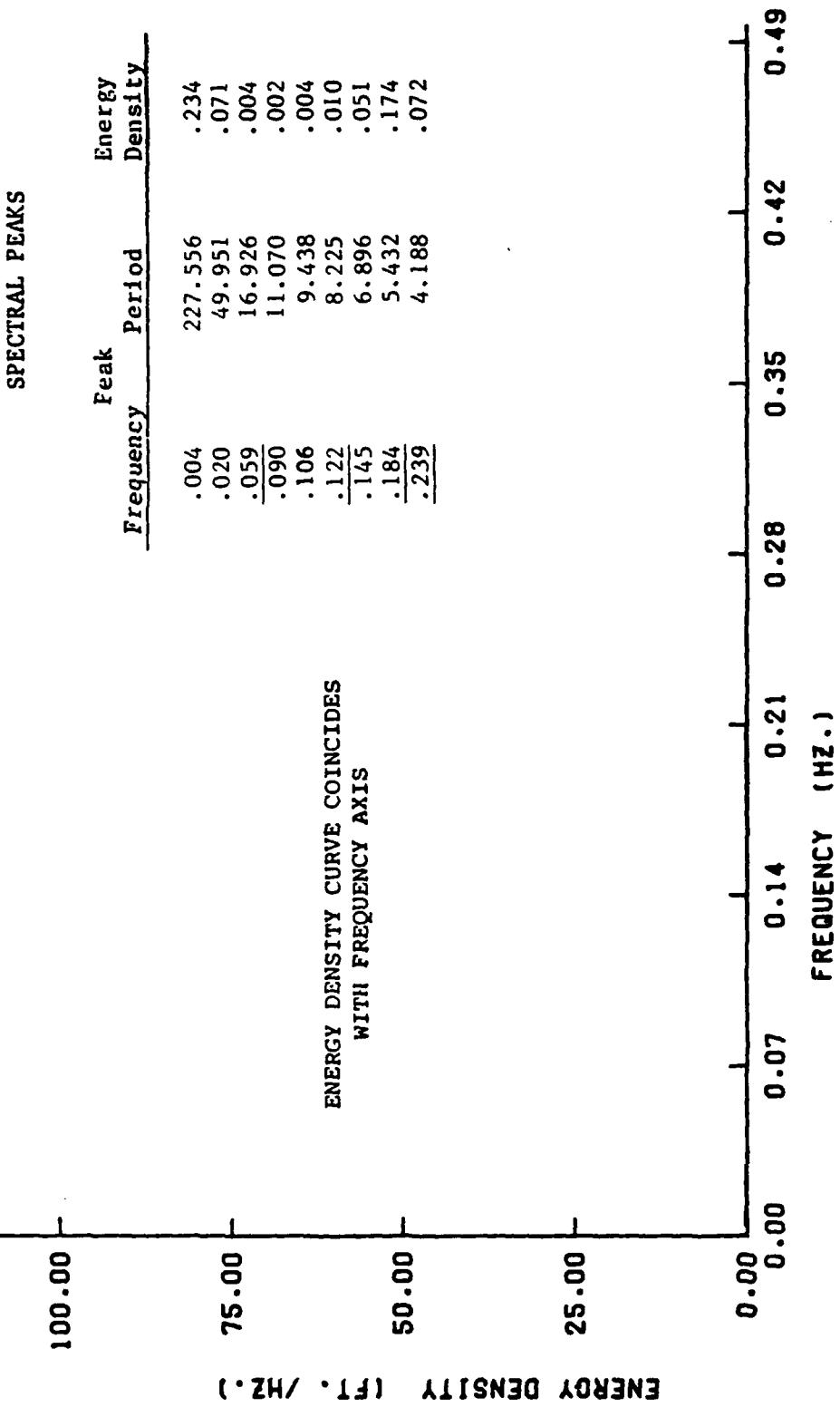


END  
FORMED  
DRAFT



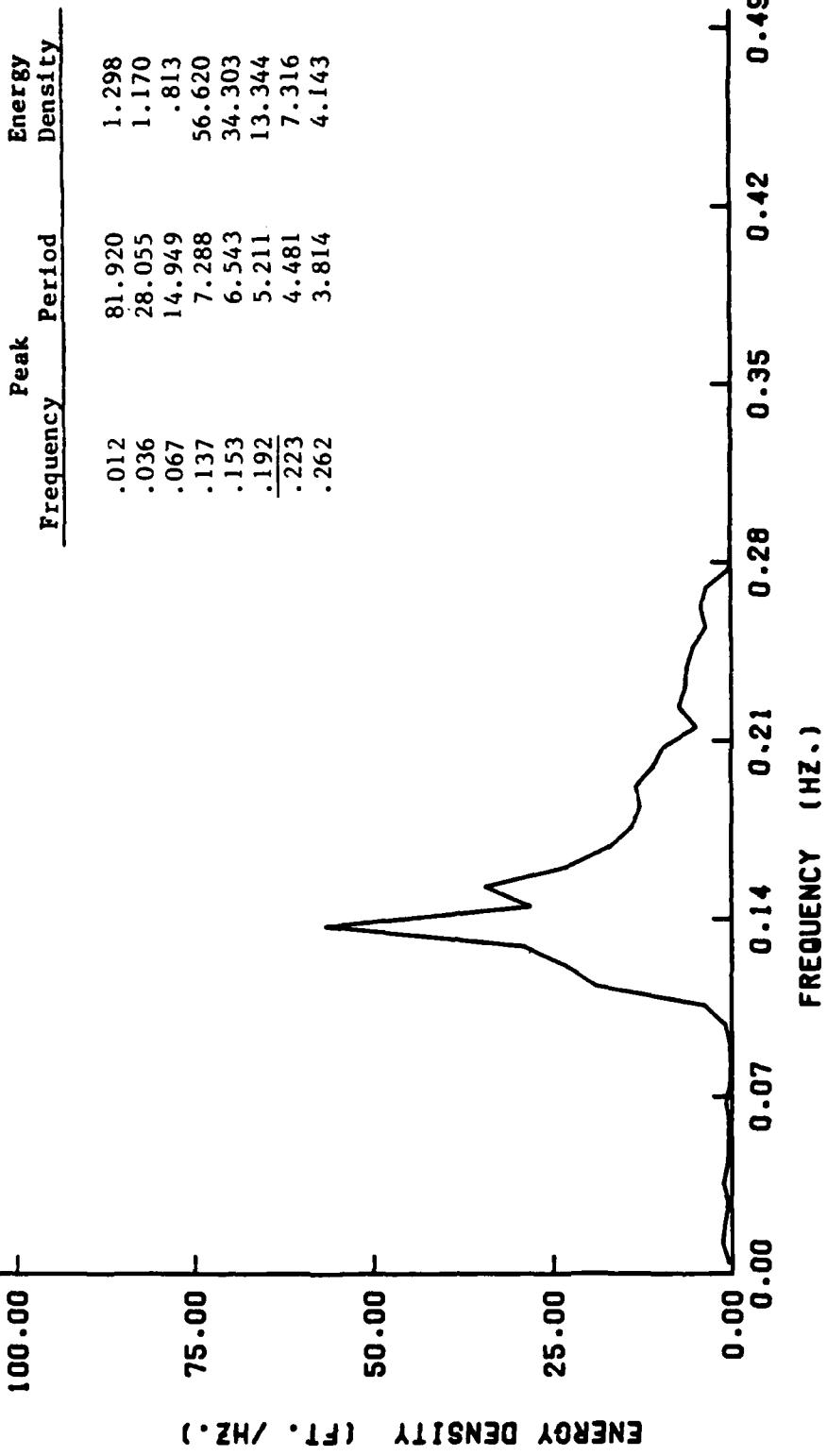
MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GAGE 7  
DATE 3/24 TIME 2330 SIG. HT. 0.43 ft. PER. 227.56 sec.

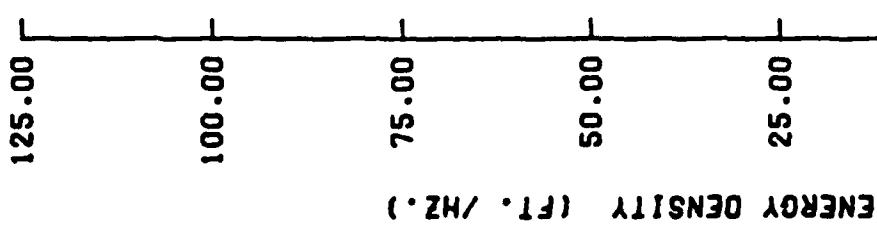


LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. CASE 67  
DATE 3/25 TIME 0130 SIG. HT. 6.55 ft. PER. 7.29 sec.

SPECTRAL PEAKS

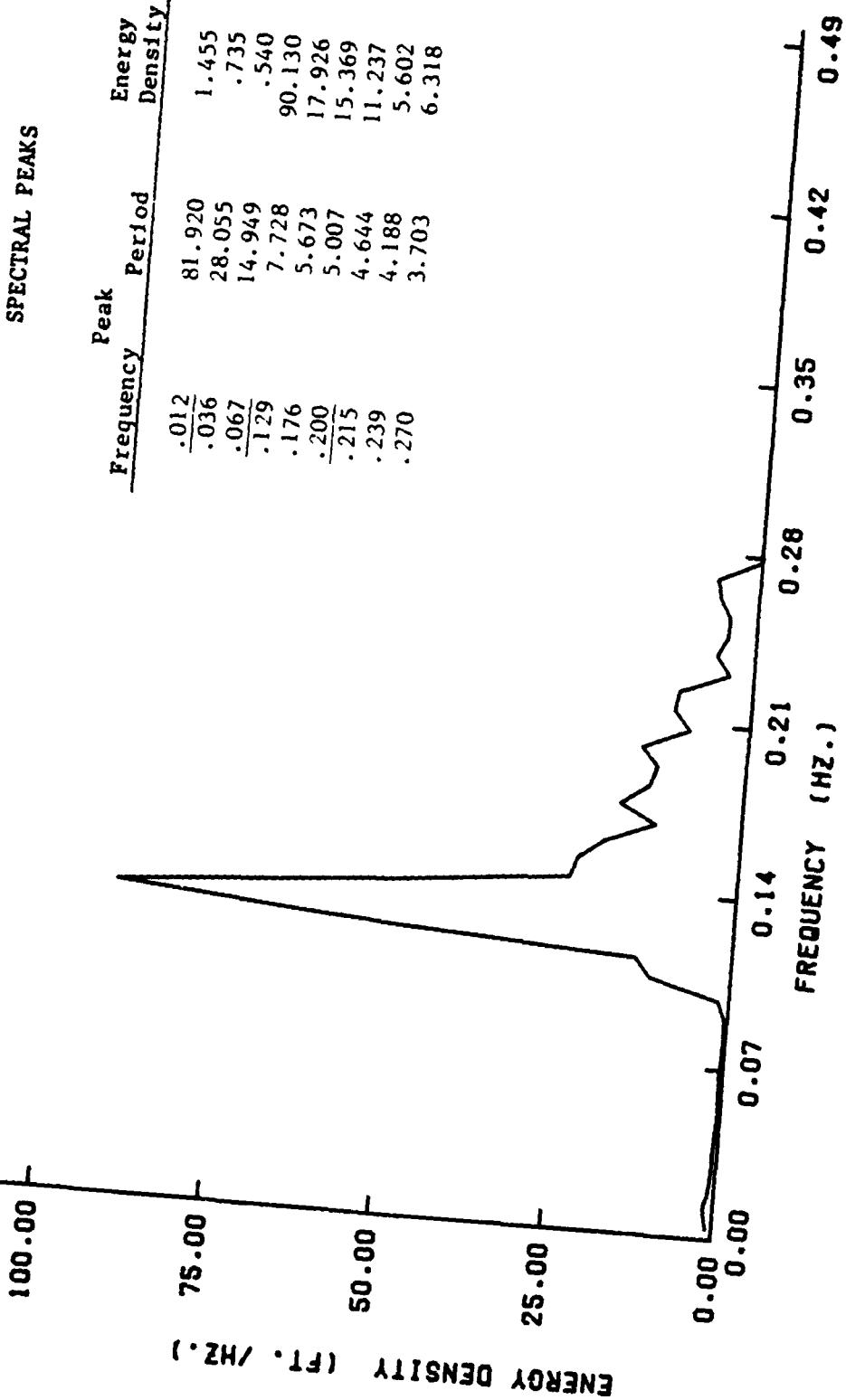


LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY, GAGE 7  
DATE 3/25 TIME 0130 SIG. HT. 0.53 ft. PER. 5.21 sec.

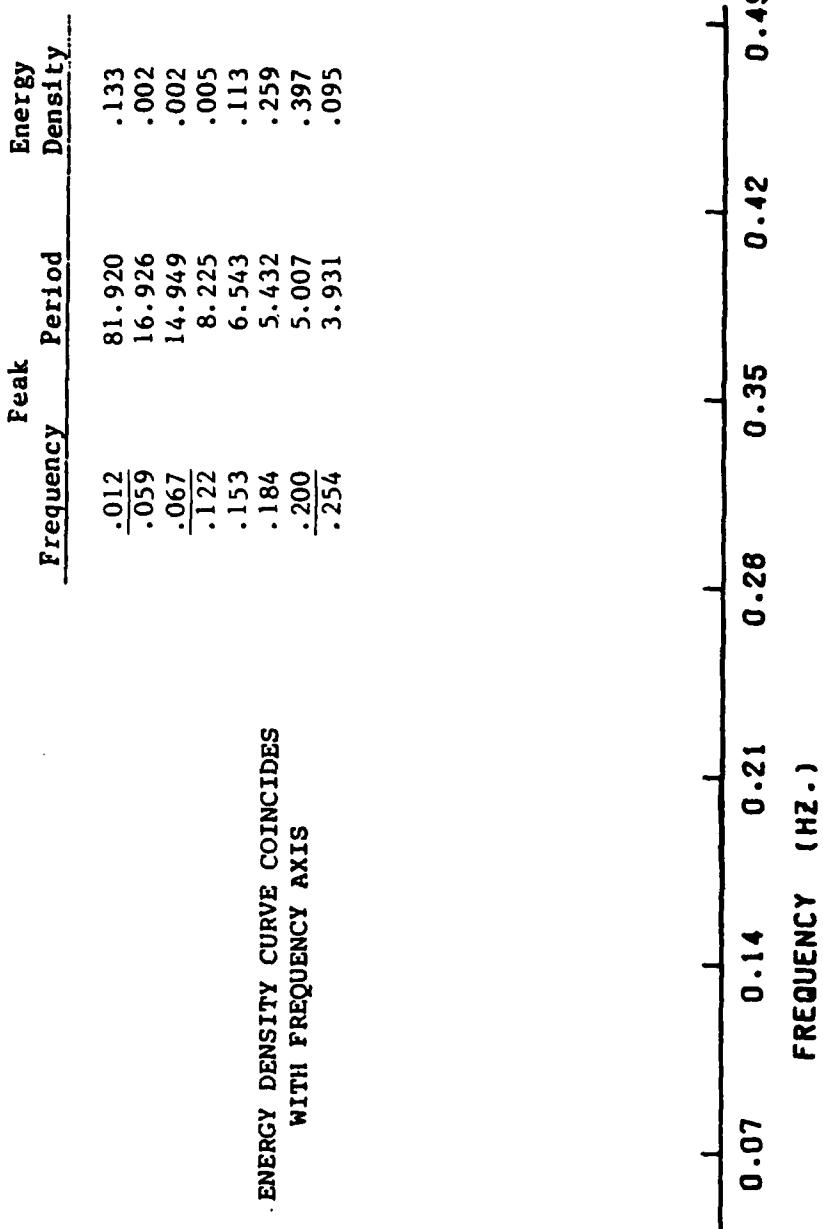
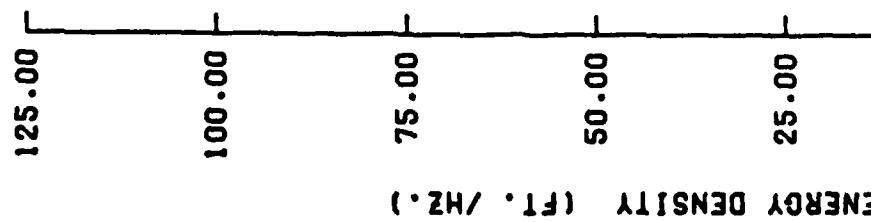


SPECTRAL PEAKS			
Frequency	Peak Period	Energy	Density
.004	227.556	.148	
.020	49.951	.083	
.059	16.926	.005	
.145	6.896	.058	
.168	5.936	.145	
.192	5.211	.277	
.247	4.055	.221	

LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GAGE 67  
DATE 325 TIME 0330 SIG. HT. 7.41 ft. PER. 7.73 sec.

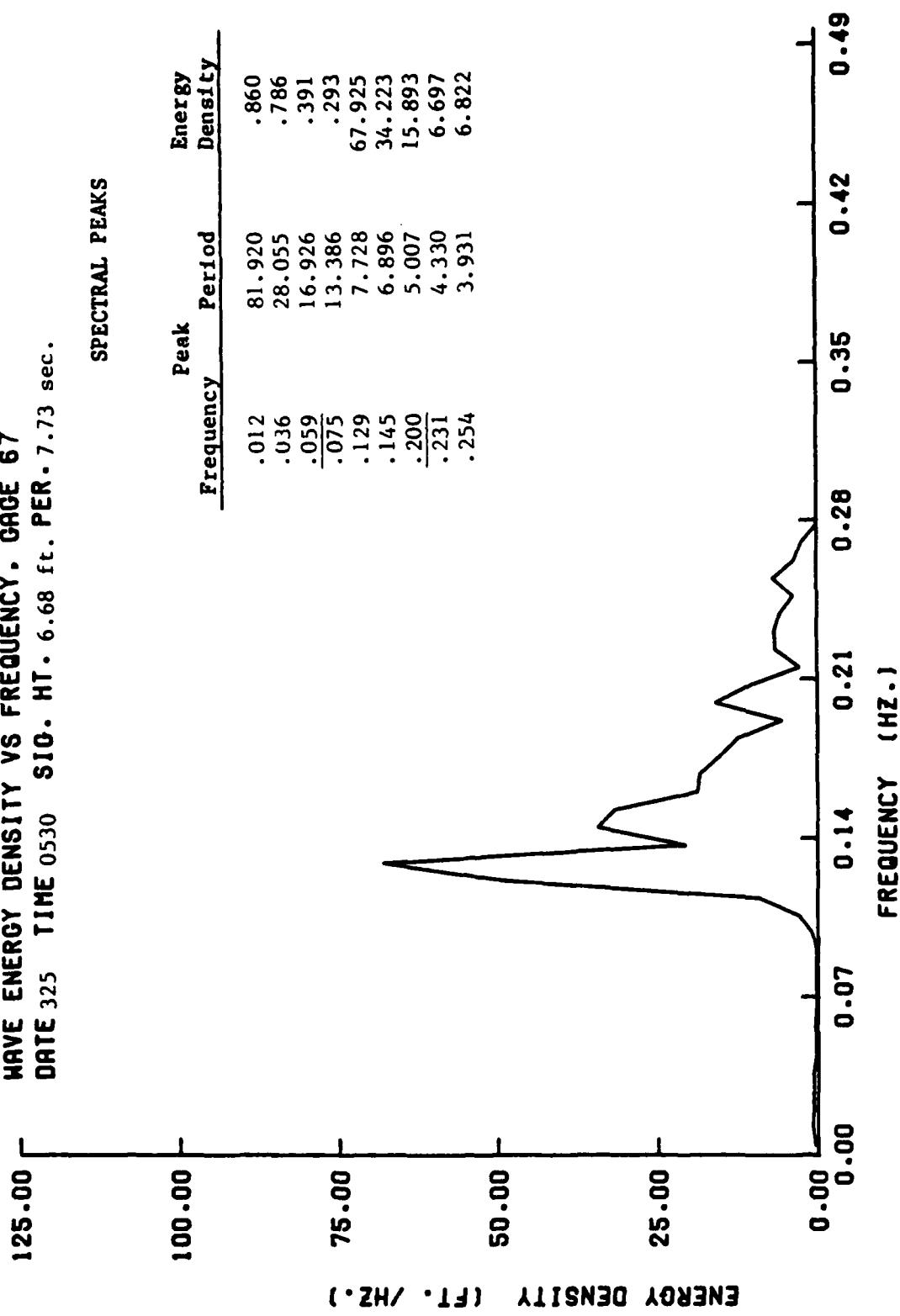


LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GAGE 7  
DATE 325 TIME 0330 SIG. HT. 0.53 ft. PER. 5.01 sec.

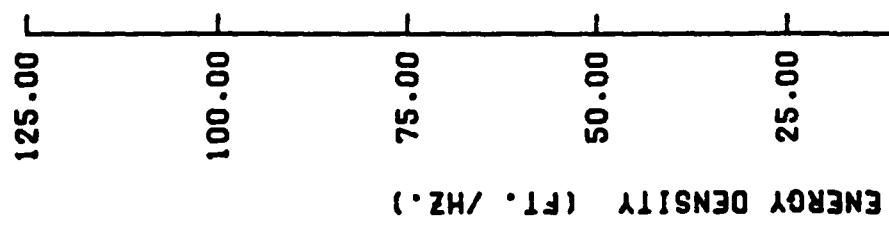


LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GAGE 67  
DATE 3/25 TIME 0530 S10. HT. 6.68 ft. PER. 7.73 sec.

SPECTRAL PEAKS



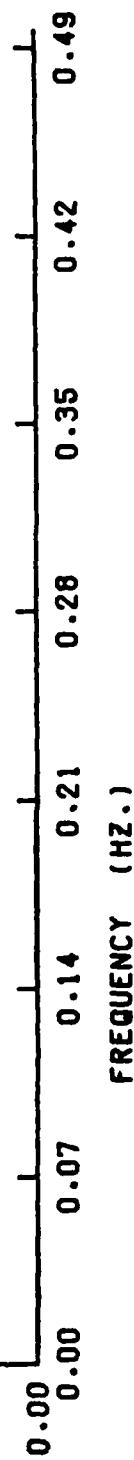
LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GAGE 7  
DATE 325 TIME 0530 SIG. HT. 0.53 ft. PER. 6.54 sec.



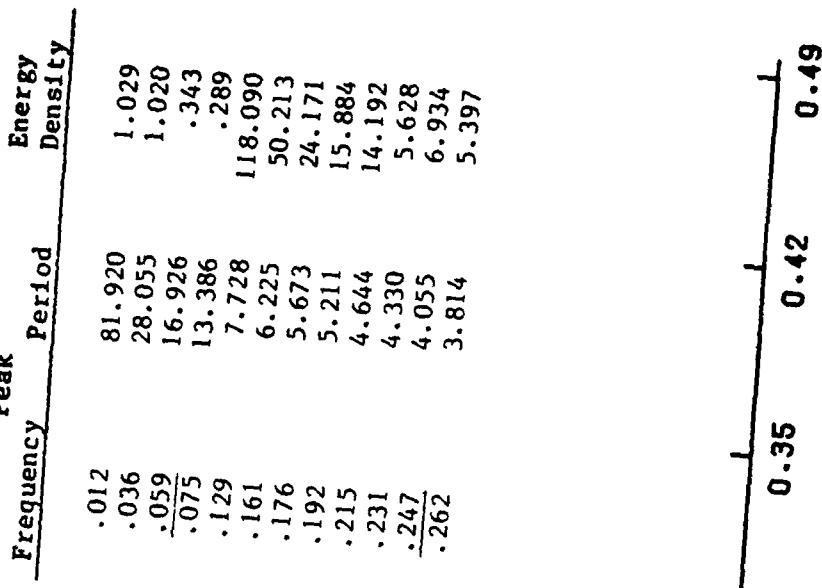
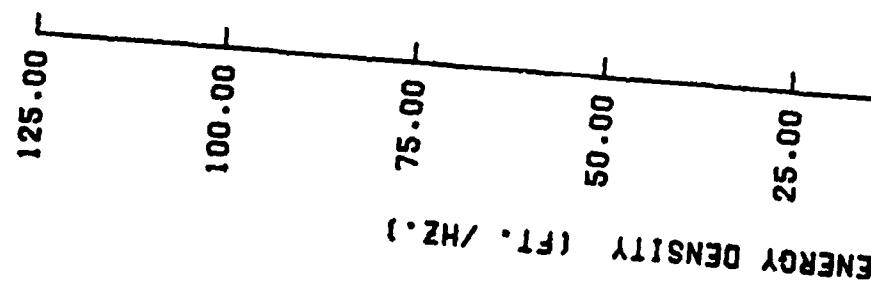
SPECTRAL PEAKS

Frequency	Peak	Period	Energy Density
.004	227.556	.108	
.059	16.926	.002	
.067	14.949	.002	
.083	12.118	.002	
.090	11.070	.002	
.153	6.543	.247	
.168	5.936	.210	
.200	5.007	.232	
.239	4.188	.091	

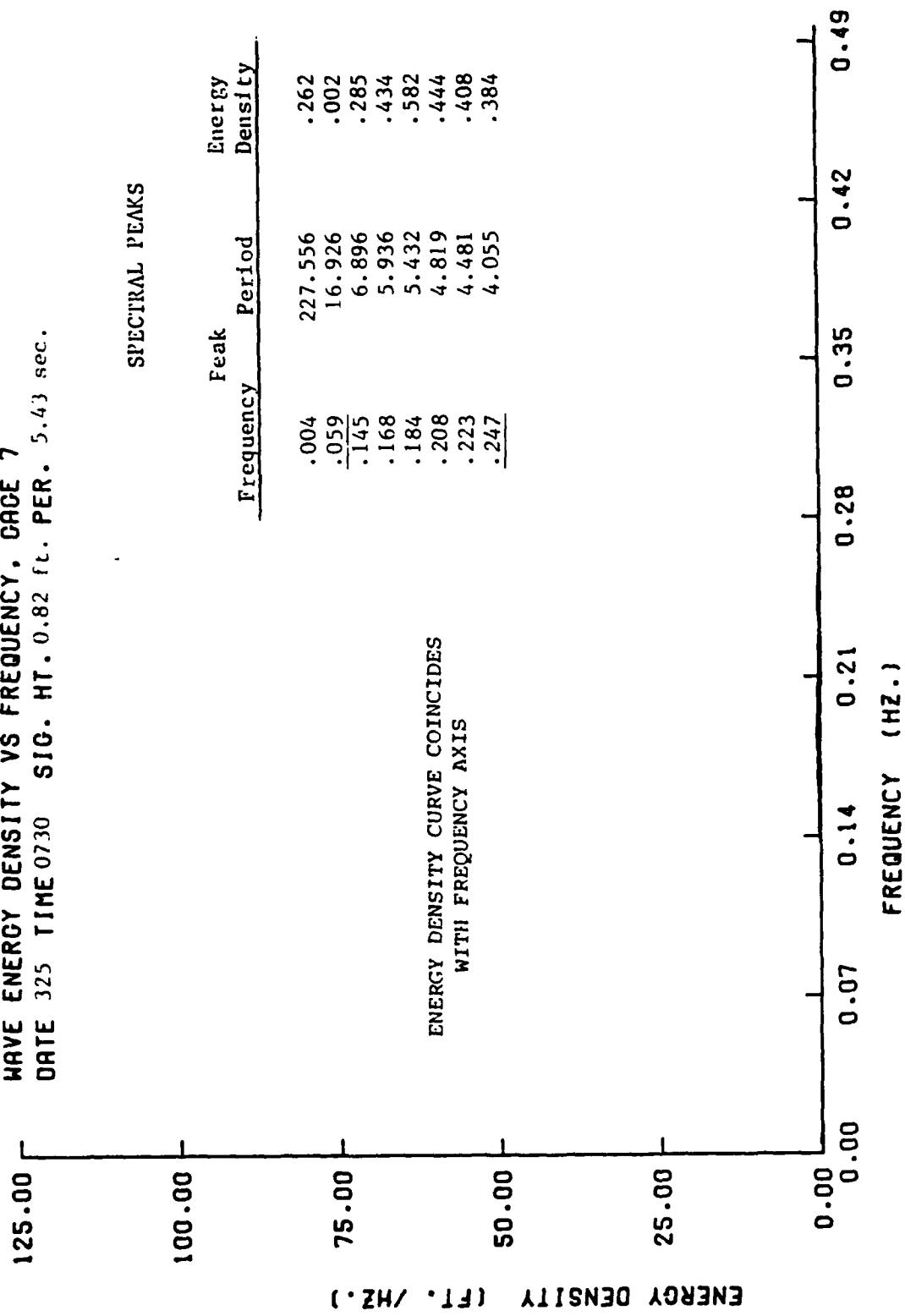
ENERGY DENSITY CURVE COINCIDES  
WITH FREQUENCY AXIS



LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GAGE 67  
DATE 3/25 TIME 0730 SIG. HT. 7.99 ft. PER. 7.73 sec.

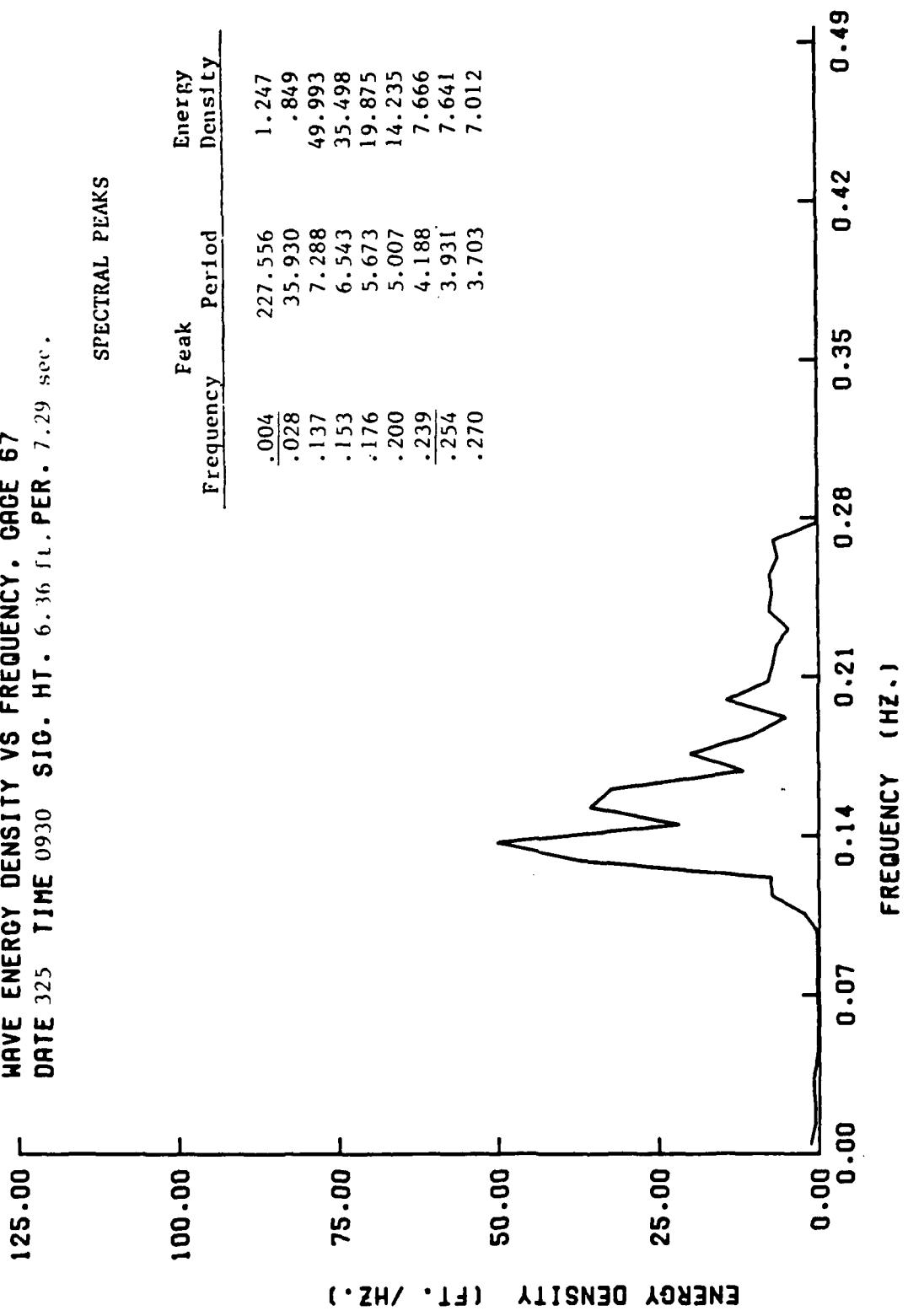


LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. CAGE 7  
DATE 325 TIME 0730 SIG. HT. 0.82 ft. PER. 5.43 sec.



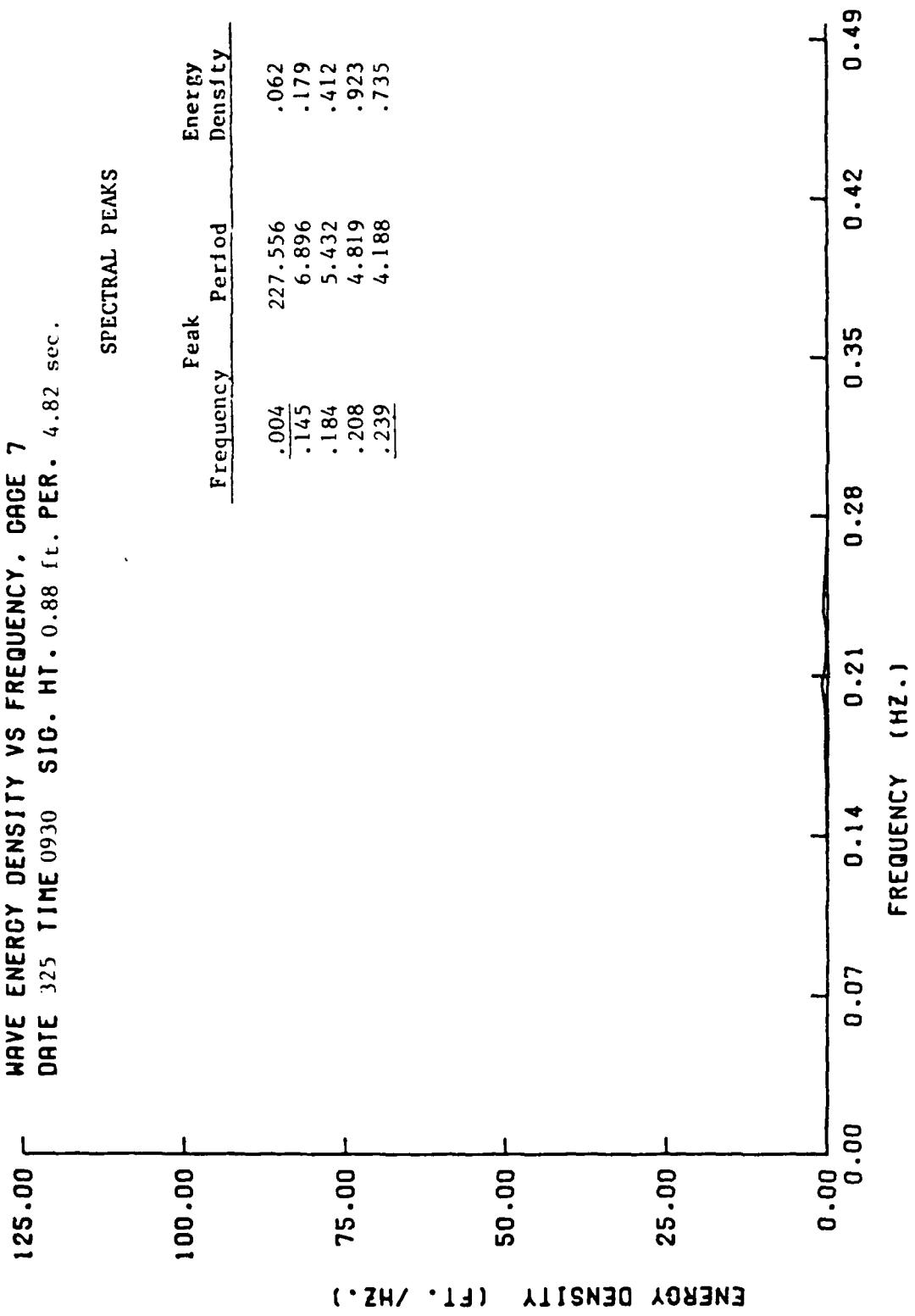
LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. CAGE 67  
DATE 3/25 TIME 0930 SIG. HT. 6.36 ft. PER. 7.29 sec.

SPECTRAL PEAKS



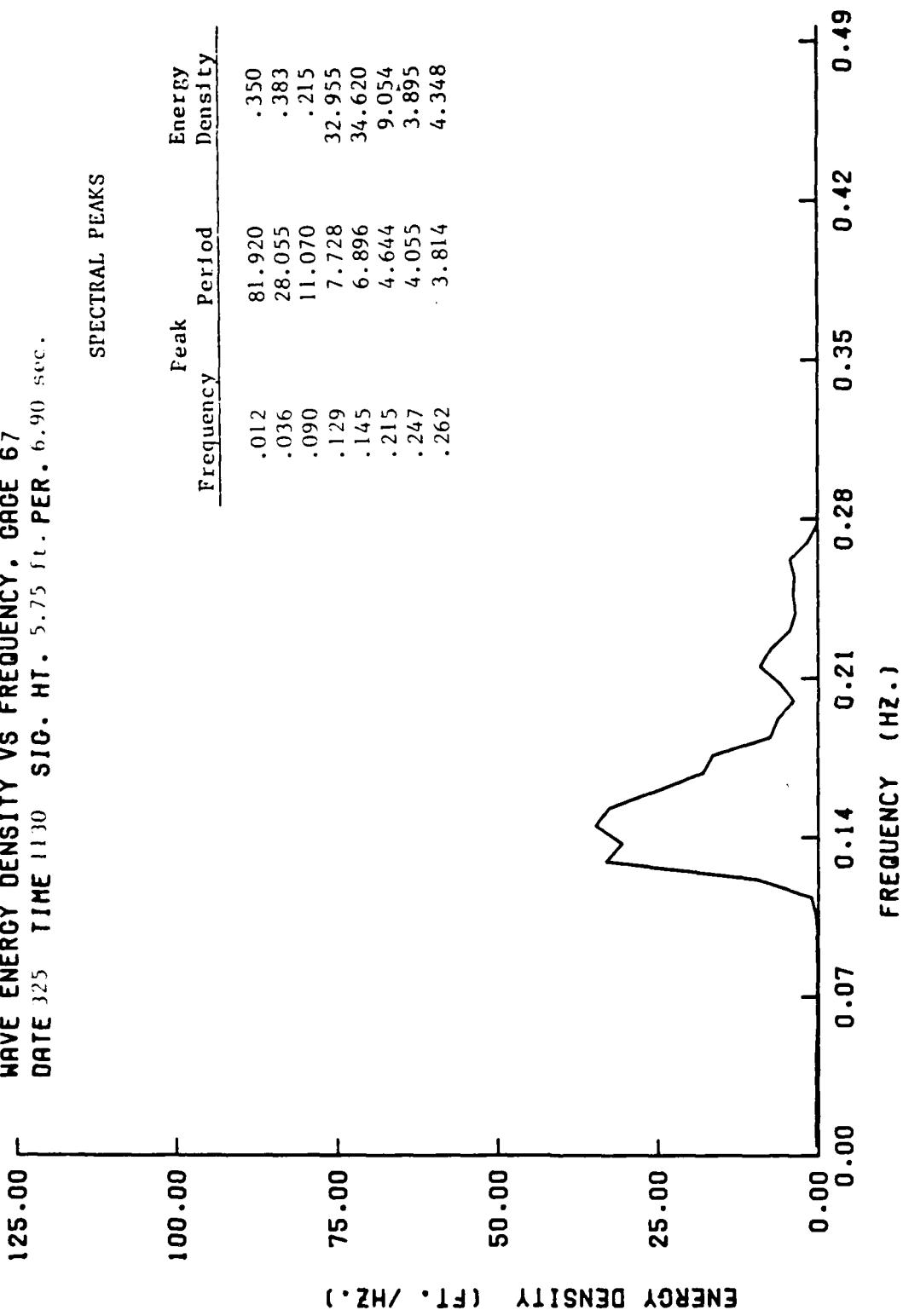
LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY, CAGE 7  
DATE 325 TIME 0930 SIG. HT. 0.88 ft. PER. 4.82 sec.

SPECTRAL PEAKS

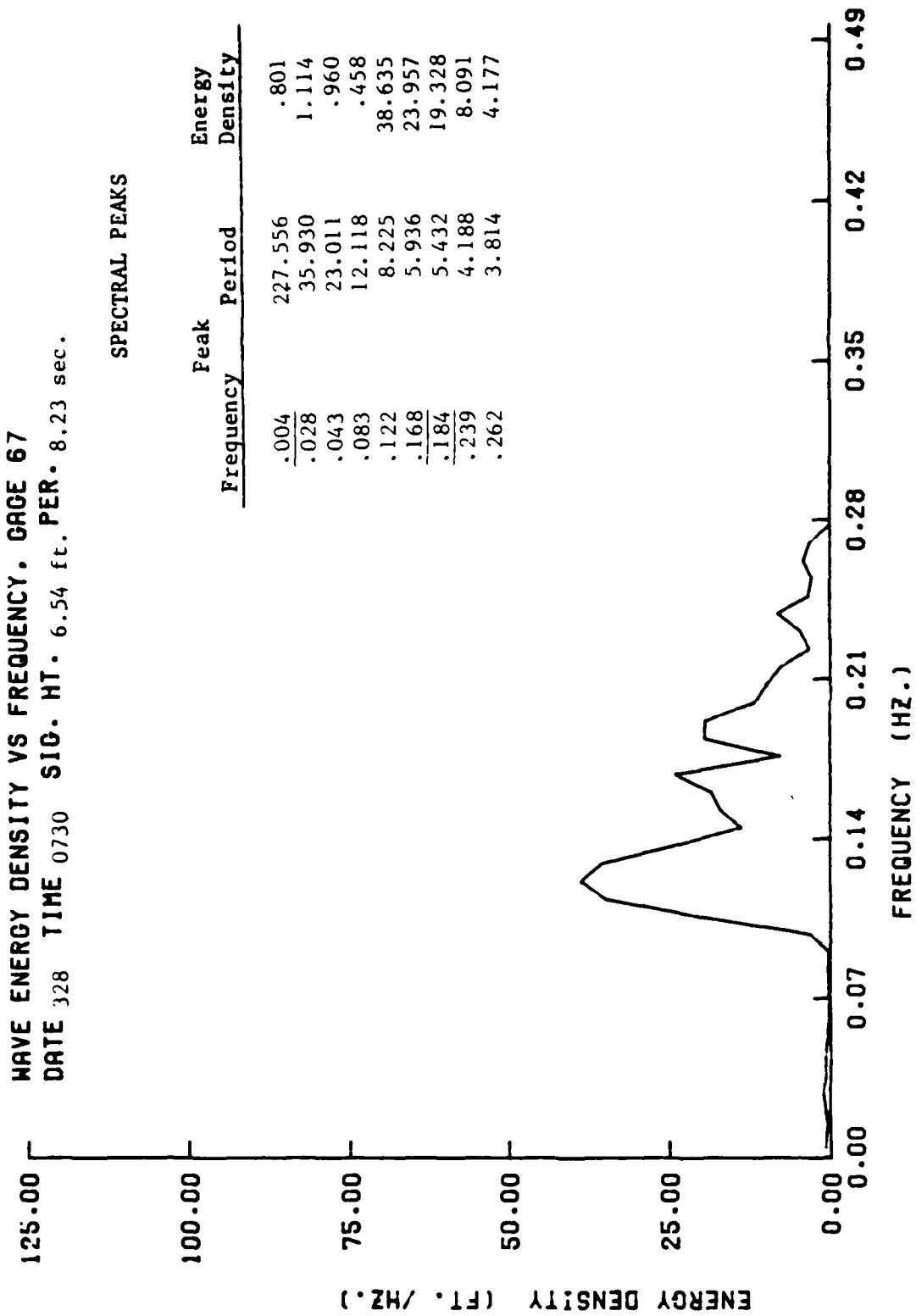


LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY, GAGE 67  
DATE 3/25 TIME 11:30 SIG. HT. 5.75 ft. PER. 6.90 sec.

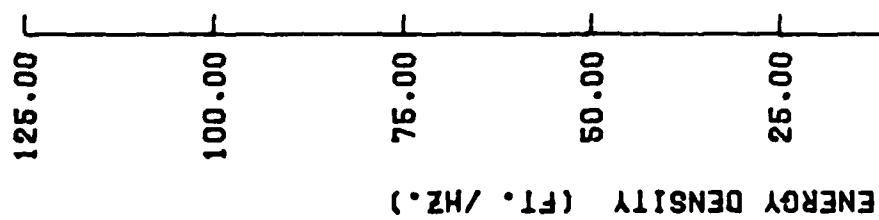
SPECTRAL PEAKS



LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GRGE 67  
DATE 328 TIME 0730 SIG. HT. 6.54 ft. PER. 8.23 sec.

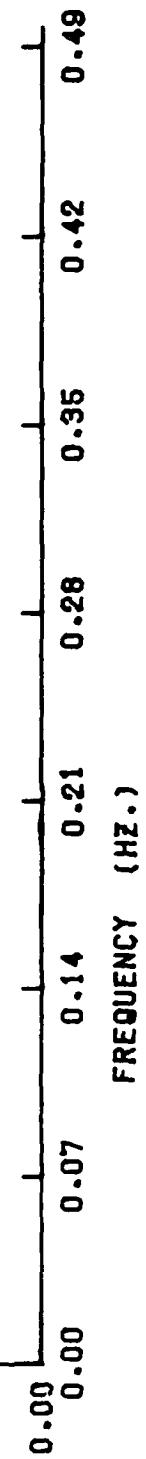


LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GAGE 7  
DATE 3/28 TIME 0530 S10. HT. 0.47 ft. PER. 5.01 sec.

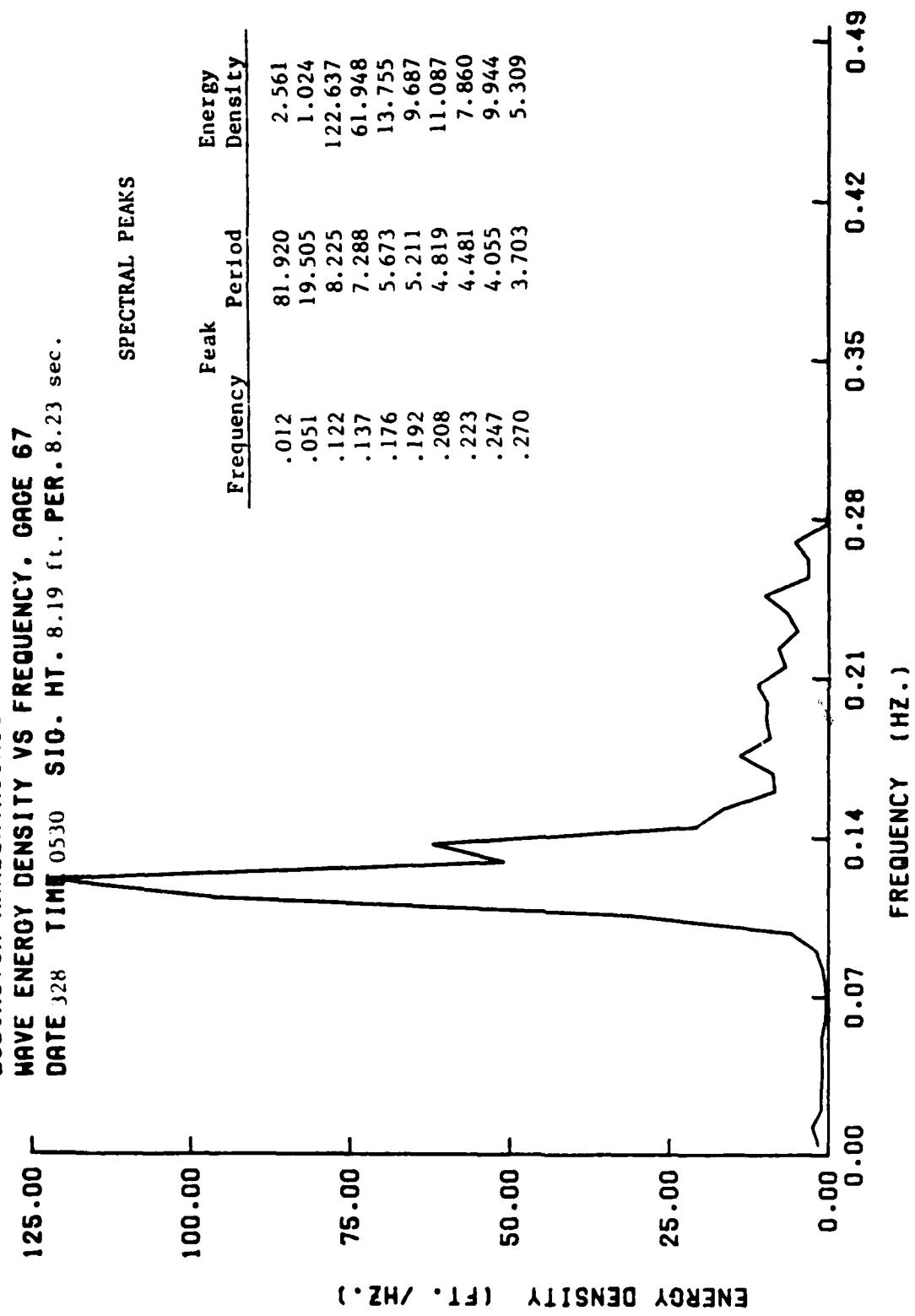


SPECTRAL PEAKS

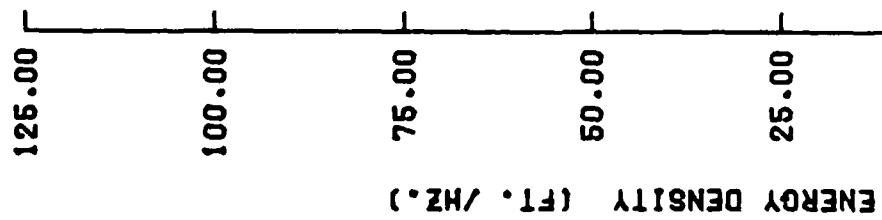
Frequency	Peak	Period	Energy Density
.004	227.556	.177	
.020	49.951	.055	
.129	7.728	.007	
.145	6.896	.043	
.168	5.936	.180	
.184	5.432	.069	
.200	5.007	.445	
.239	4.188	.040	
.262	3.814	.063	



LUDINGTON HARBOR-MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GAGE 67  
DATE 3/28 TIME 0530 SIG. HT. 8.19 ft. PER. 8.23 sec.



LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY, GRADE 7  
DATE 3/28 TIME 0330 SIG. HT. 0.40 ft. PER. 227.56 sec.



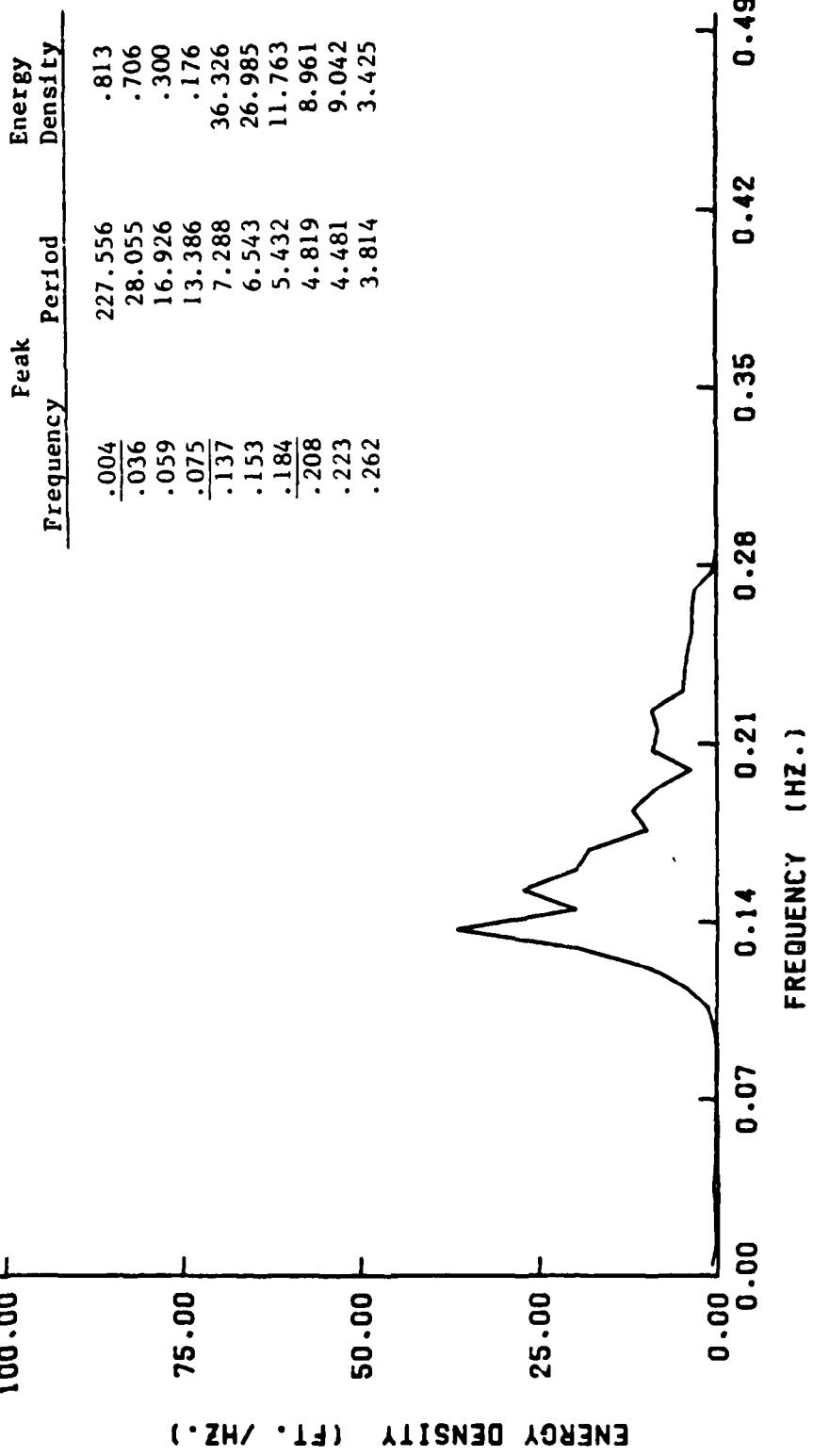
SPECTRAL PEAKS

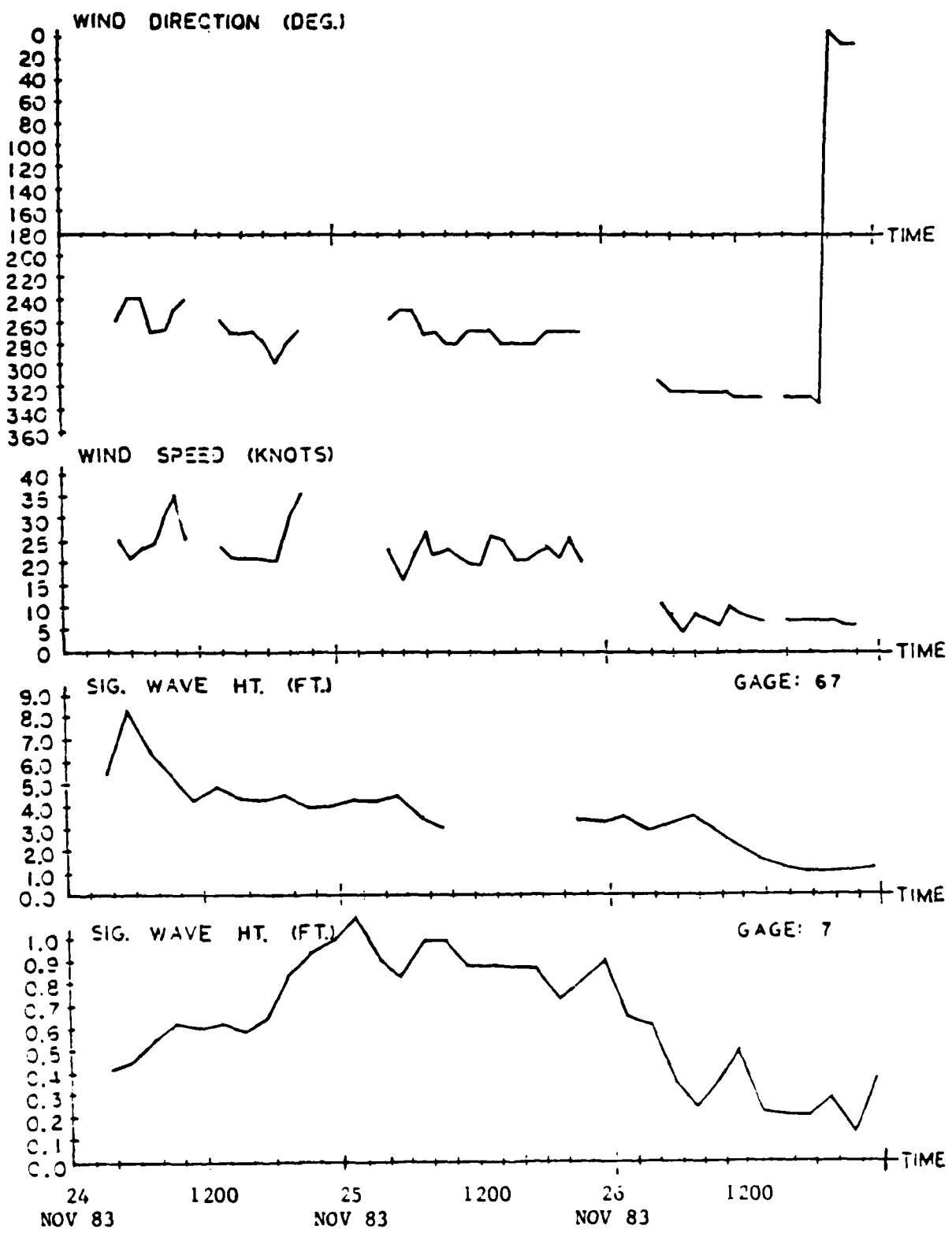
Peak Frequency	Period	Energy Density
.004	227.556	.588
<u>.075</u>	13.386	.002
.090	11.070	.002
.106	9.438	.006
.122	8.225	.018
.145	6.896	.031
.168	5.936	.082
<u>.184</u>	5.432	.062
.200	5.007	.084
.239	4.188	.025
.254	3.931	.027

ENERGY DENSITY CURVE COINCIDES  
WITH FREQUENCY AXIS

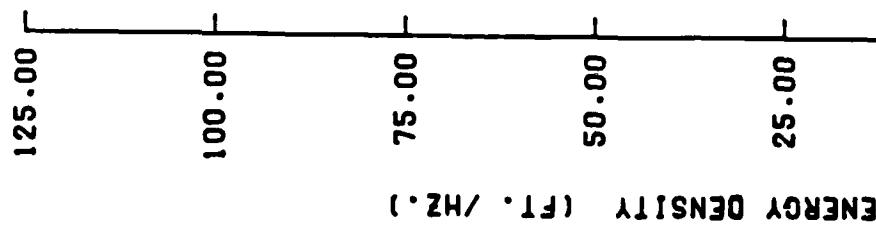
LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GAGE 67  
DATE 3/28 TIME 3:30 SIG. HT. 5.49 ft. PER. 7.29 sec.

SPECTRAL PEAKS





LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GAGE 7  
DATE 325 TIME 1730 SIG. HT. 0.68 ft. PER. 4.06 sec.

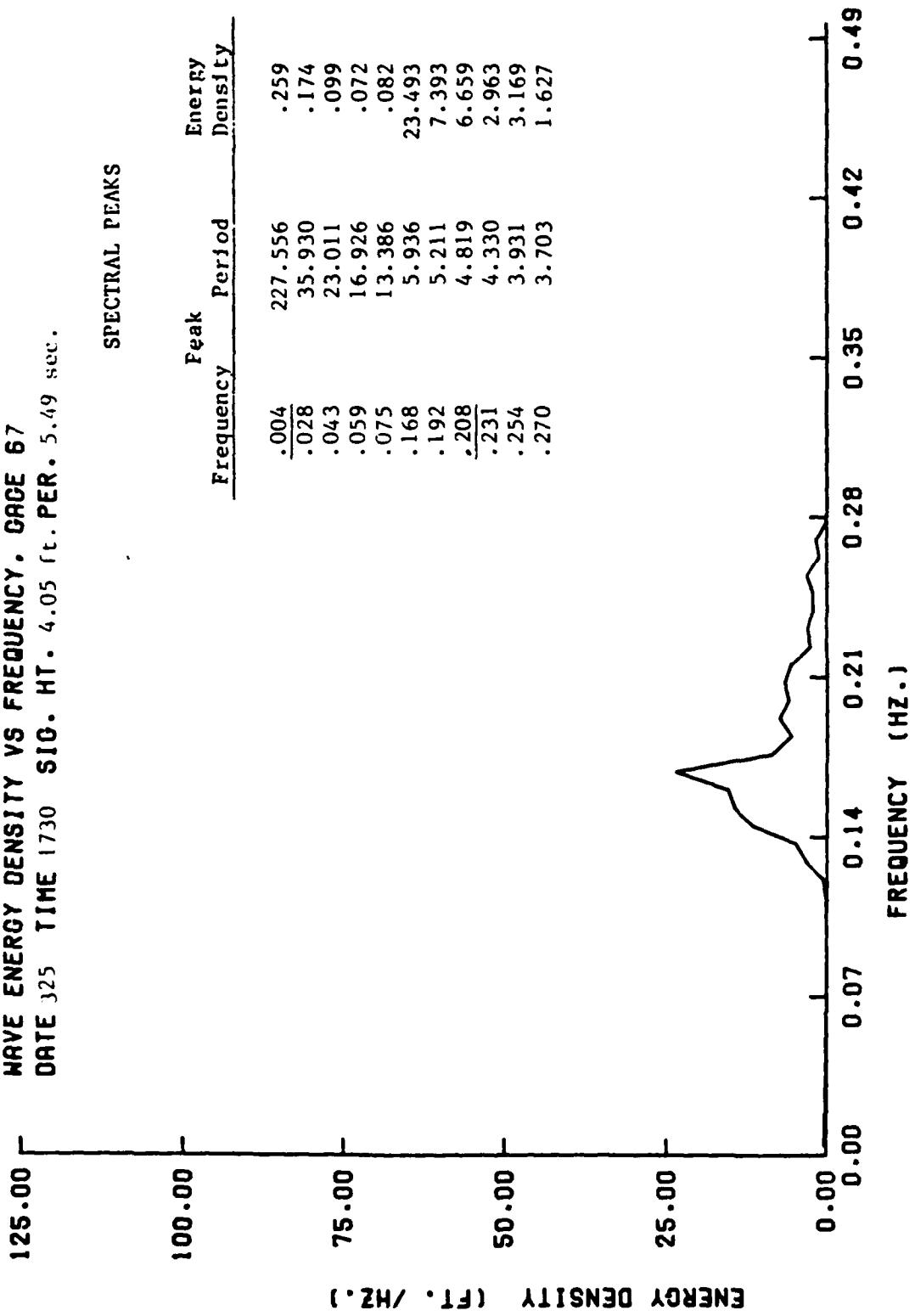


SPECTRAL PEAKS

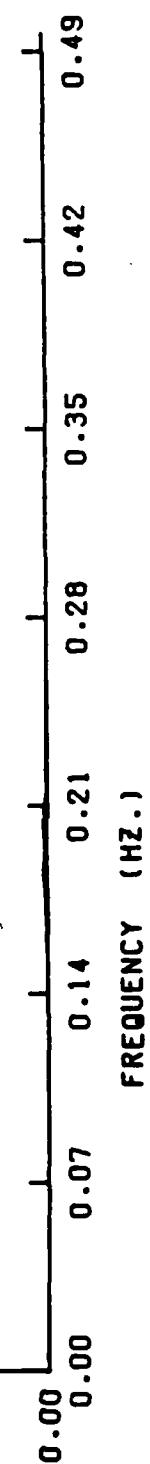
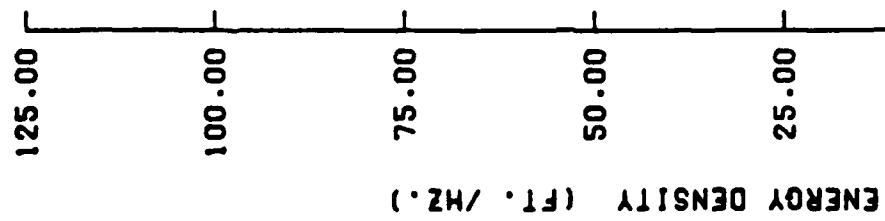
Peak Frequency	Period	Energy Density
.004	227.556	.121
.184	5.432	.405
.208	4.819	.494
.247	4.055	.549

ENERGY DENSITY CURVE COINCIDES  
WITH FREQUENCY AXIS

LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY, GRCE 67  
DATE 3/25 TIME 1730 SIG. HT. 4.05 ft. PER. 5.49 sec.



LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GAGE 7  
DATE 325 TIME 1530 SIG. HT. 0.63 ft. PER. 4.82 sec.



LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GAGE 67  
DATE 3/25 TIME 1530 SIG. HT. 4.63 ft. PER. 6.23 sec.

SPECTRAL PEAKS

Frequency	Peak	Period	Energy
			Density
.028	35.930		.402
.067	14.949		.075
.161	6.225		33.074
.200	5.007		5.596
.215	4.644		8.930
.231	4.330		6.800
.254	3.931		3.648

100.00

125.00

100.00

75.00

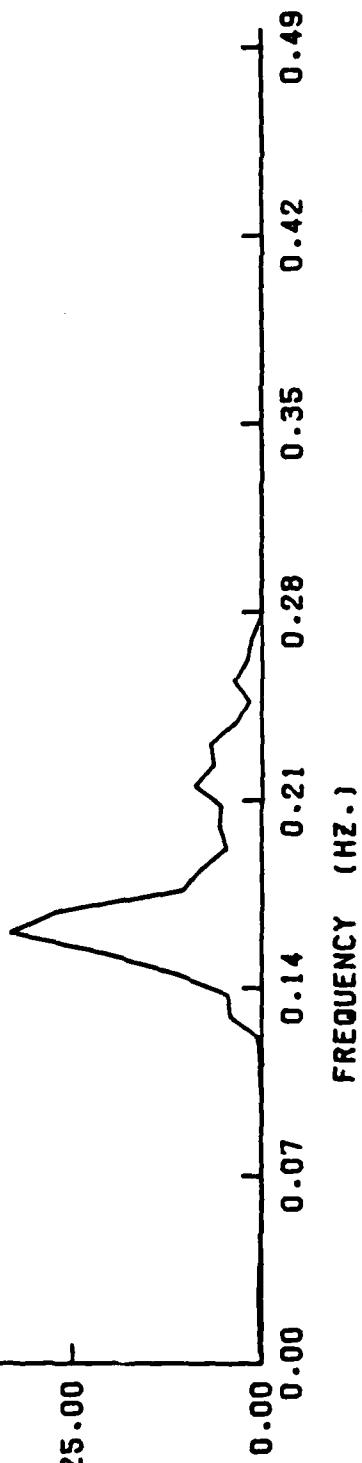
50.00

25.00

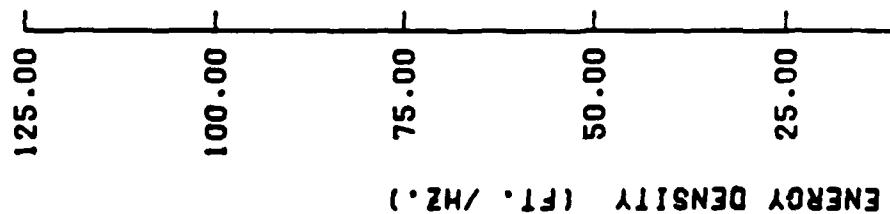
0.00

ENERGY DENSITY (FT. /HZ.)

B47



LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY, CAGE 7  
DATE 3/25 TIME 1330 SIG. HT. 0.67 ft. PER. 5.43 sec.

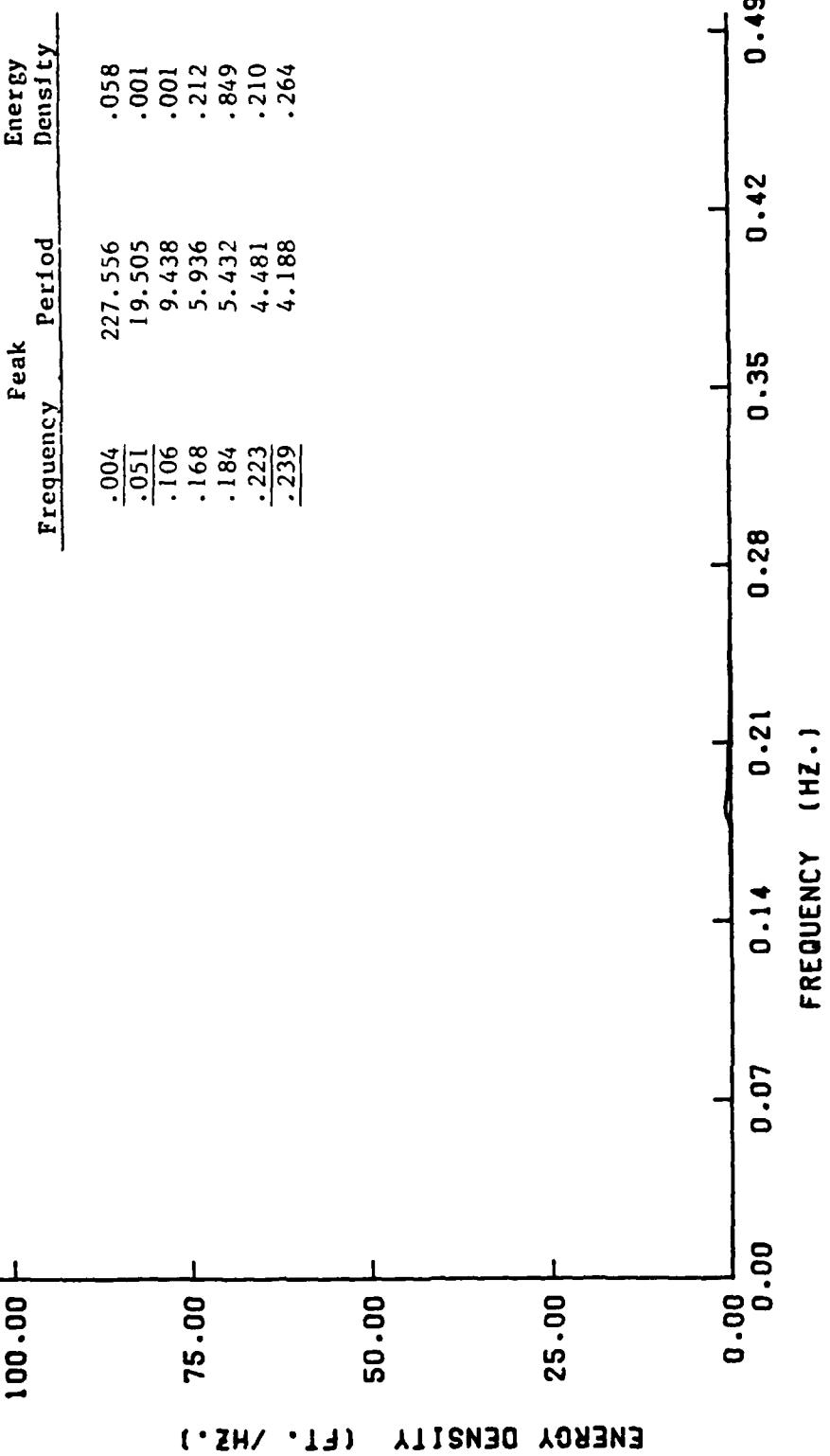


SPECTRAL PEAKS

Frequency	Peak	Period	Energy Density
.004	227.556		.058
<u>.051</u>	19.505		.001
.106	9.438		.001
.168	5.936		.212
.184	5.432		.849
.223	4.481		.210
<u>.239</u>	4.188		.264

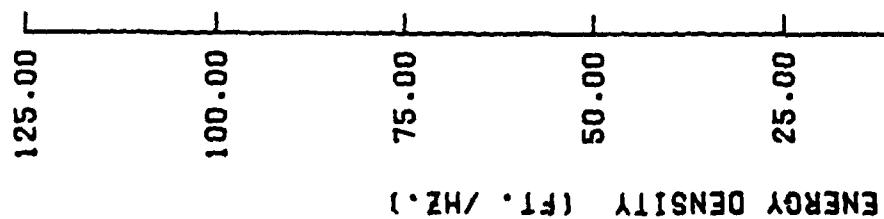
LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY, GAGE 7  
DATE 3/25 TIME 1330 SIG. HT. 0.67 ft. PER. 5.43 sec.

SPECTRAL PEAKS



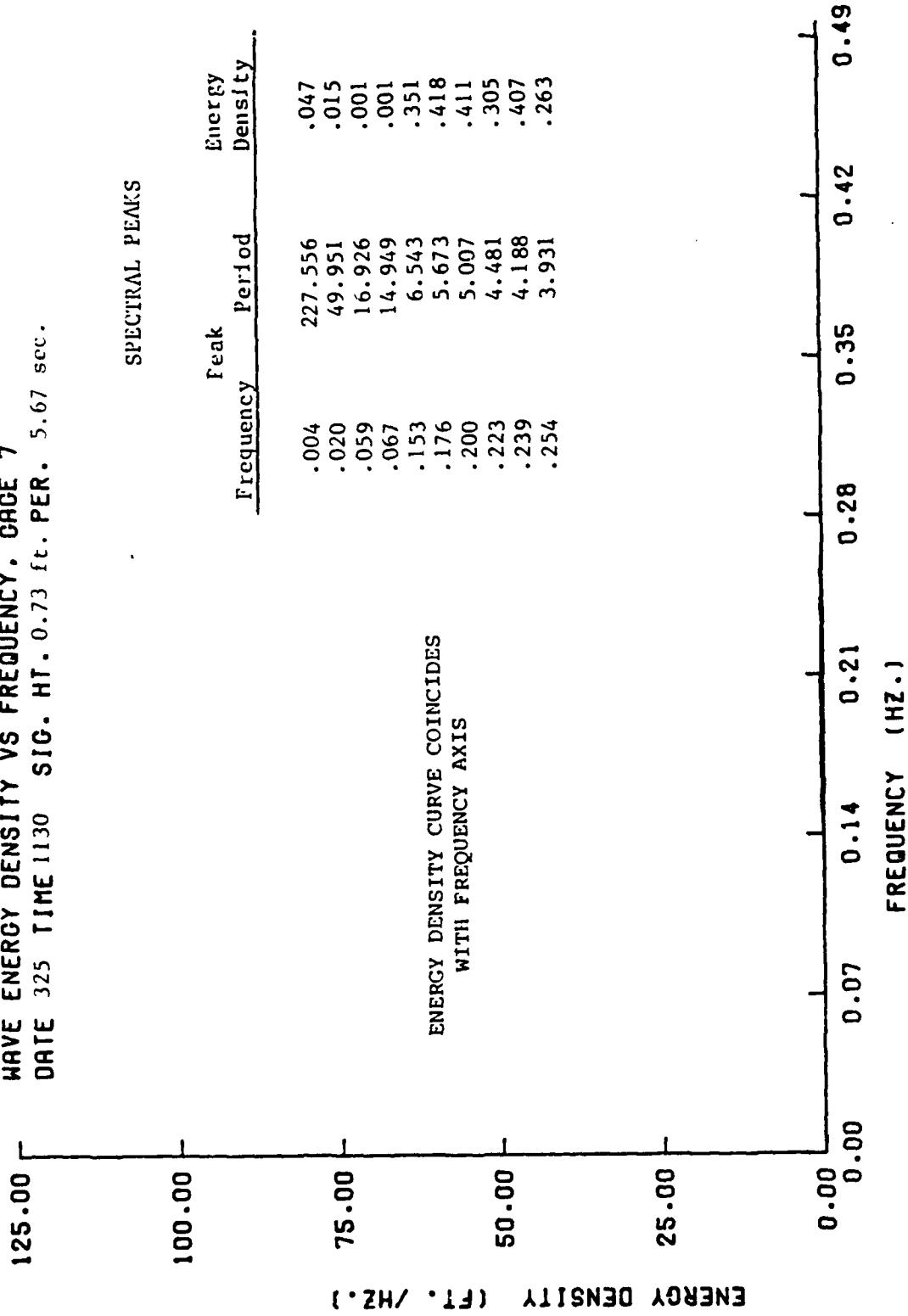
LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY, GAGE 67  
DATE 3/25 TIME 1330 SIG. HT. 5.39 ft. PER. 6.90 sec.

SPECTRAL PEAKS



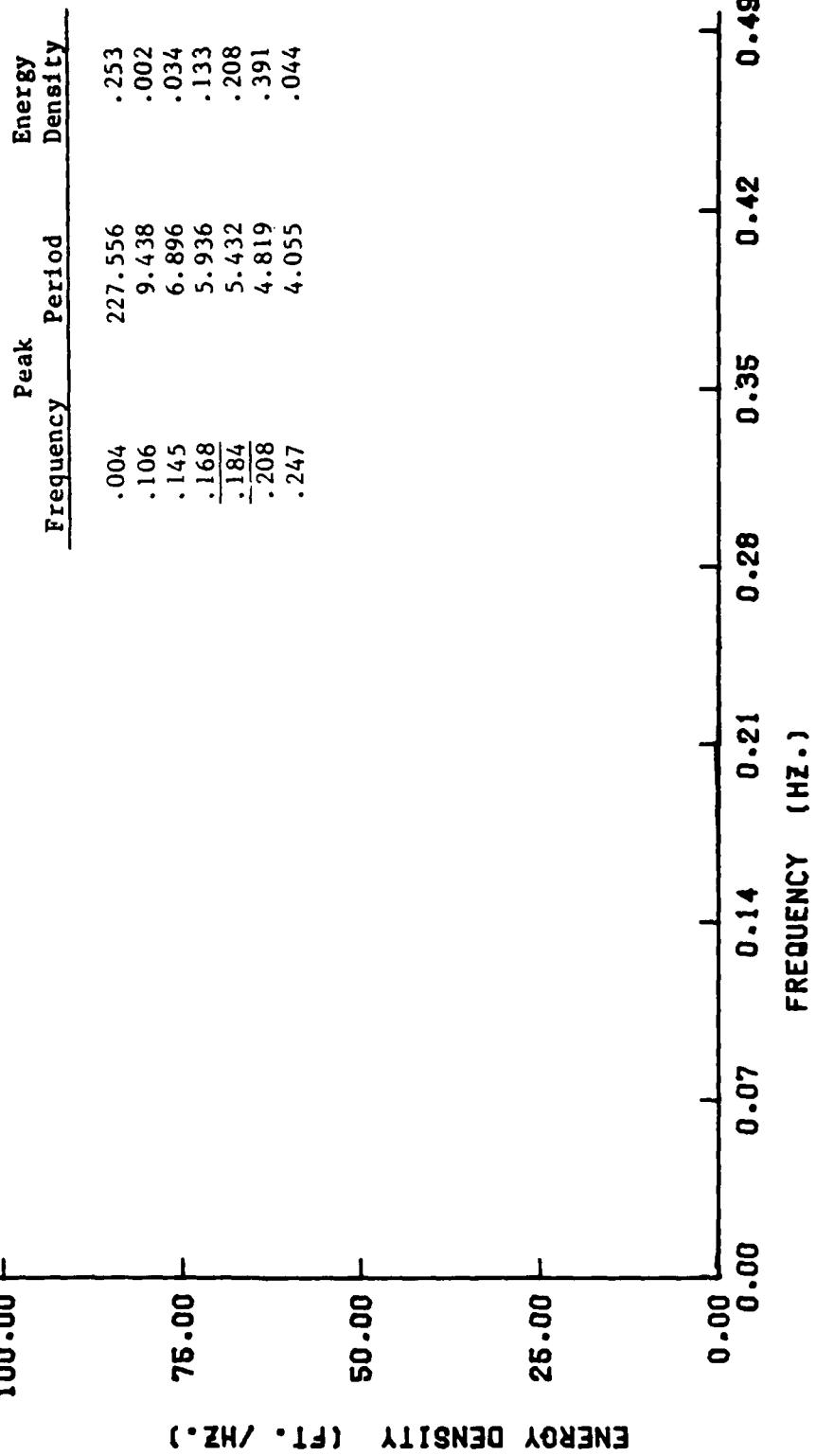
Peak Frequency	Period	Energy Density
.004	227.556	.273
.028	35.930	.245
.051	19.505	.163
.083	12.118	.082
.145	6.896	65.176
.161	6.225	25.055
.223	4.481	5.218
.239	4.188	4.098
.254	3.931	3.638
.270	3.703	2.915

LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GAGE 7  
DATE 325 TIME 1130 SIG. HT. 0.73 ft. PER. 5.67 sec.



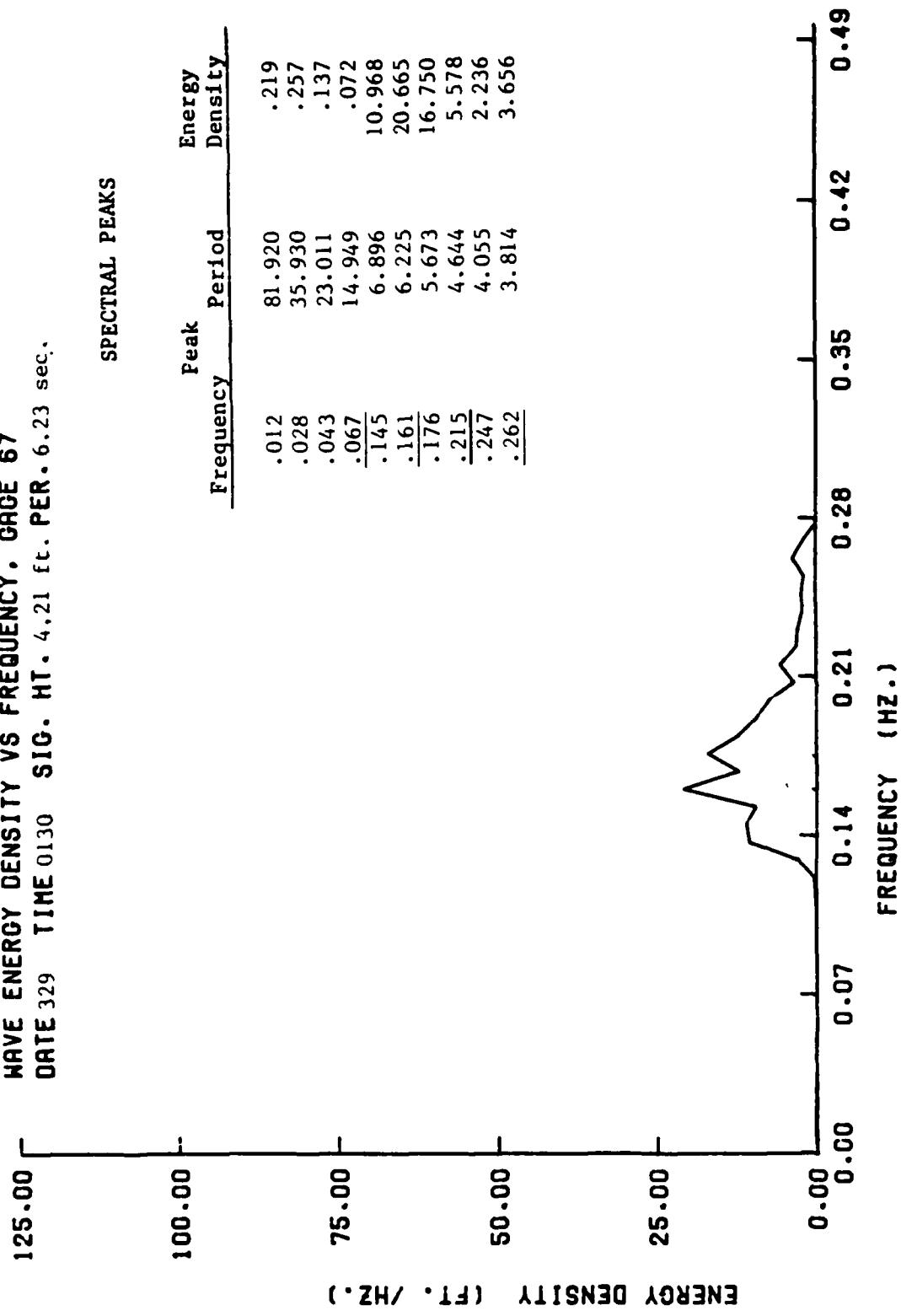
LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY, GAGE '7  
DATE 3/28 TIME 0730 SIG. HT. 0.52 ft. PER 4.82 sec.

SPECTRAL PEAKS

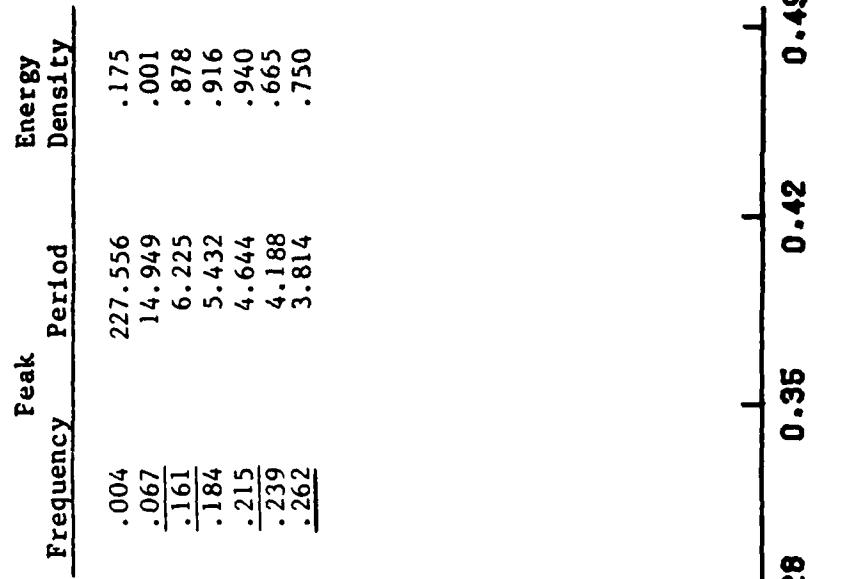
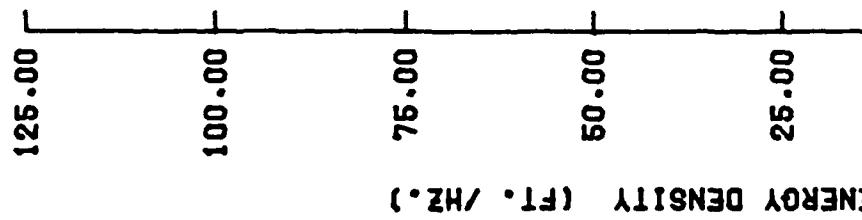


LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GAGE 67  
DATE 3/29 TIME 0130 SIG. HT. 4.21 ft. PER. 6.23 sec.

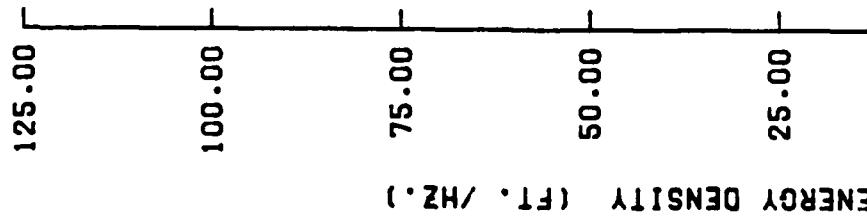
SPECTRAL PEAKS



LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GRADE 7  
DATE 3/29 TIME 0130 SIG. HT. 1.13 ft. PER. 4.64 sec.

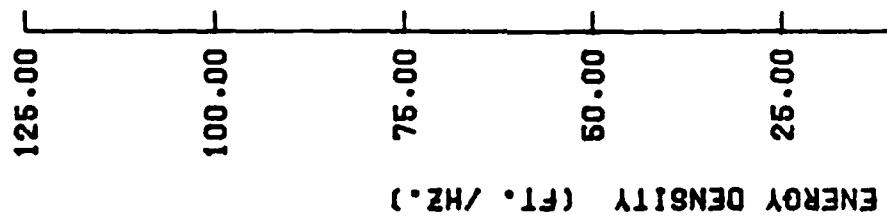


LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GAGE 67  
DATE 3/29 TIME 0730 SIG. HT. 3.32 ft. PER. 5.94 sec.



SPECTRAL PEAKS			
Peak Frequency	Period	Energy Density	
.028	35.930	.123	
.043	23.011	.057	
.083	12.118	.023	
.098	10.189	.025	
.168	5.936	13.053	
.223	4.481	3.395	
.239	4.188	2.072	
.262	3.814	2.911	

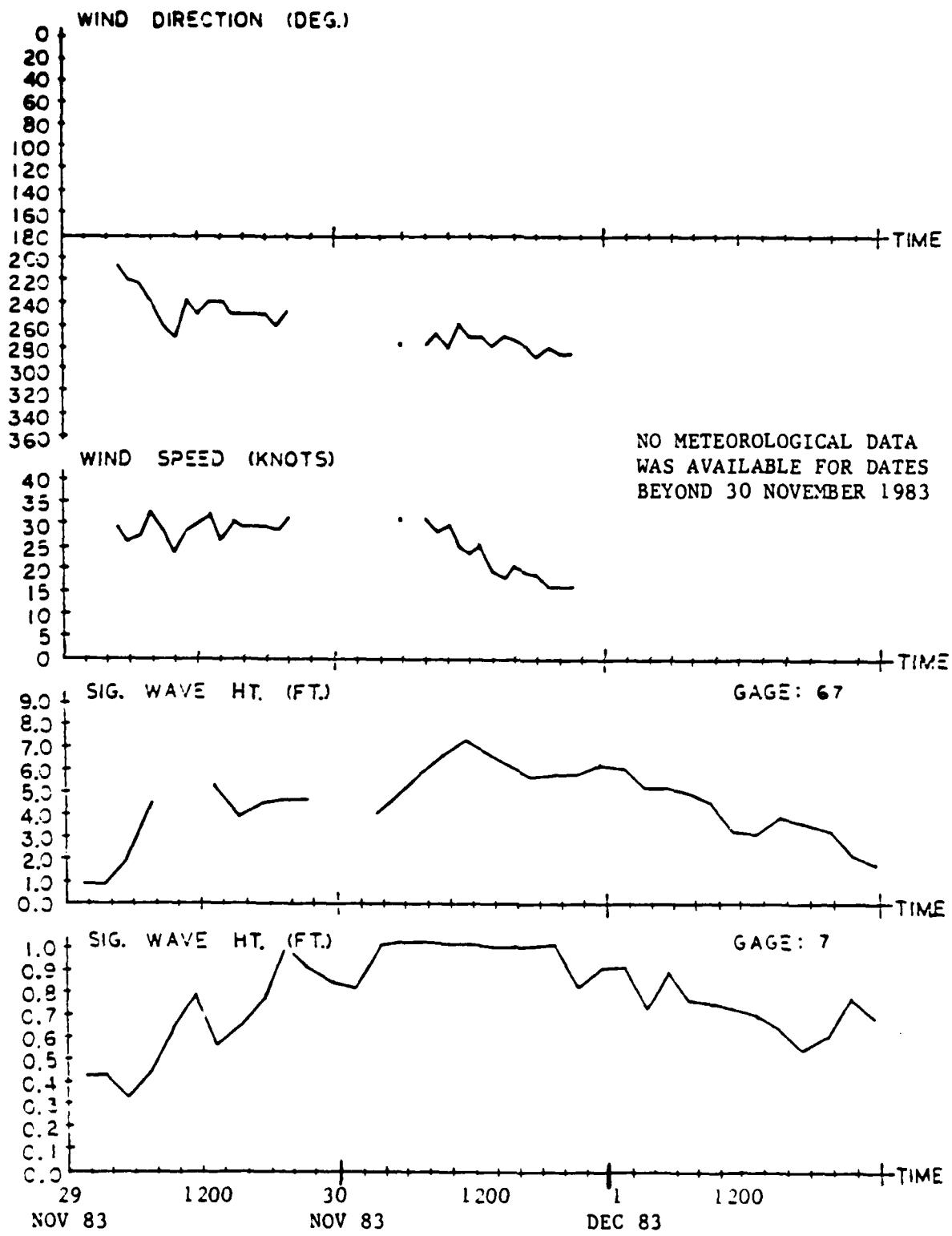
LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY, GRADE 7  
DATE 3/29 TIME 0730 SIG. HT. 1.03 ft. PER. 5.01 sec.



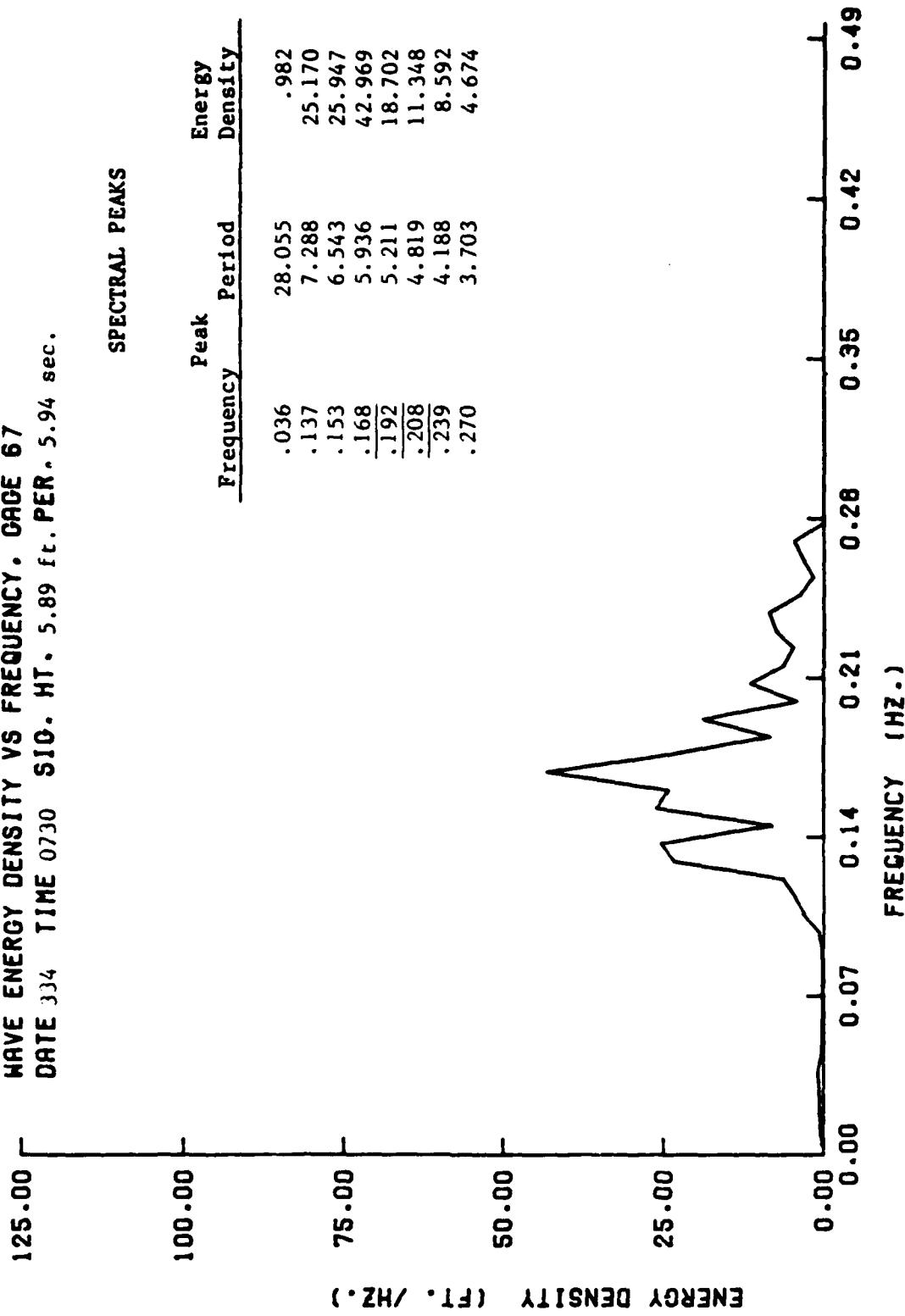
SPECTRAL PEAKS

Peak Frequency	Period	Energy Density
.004	227.556	.241
.184	5.432	.846
.200	5.007	2.374
<u>.239</u>	<u>4.188</u>	<u>.620</u>

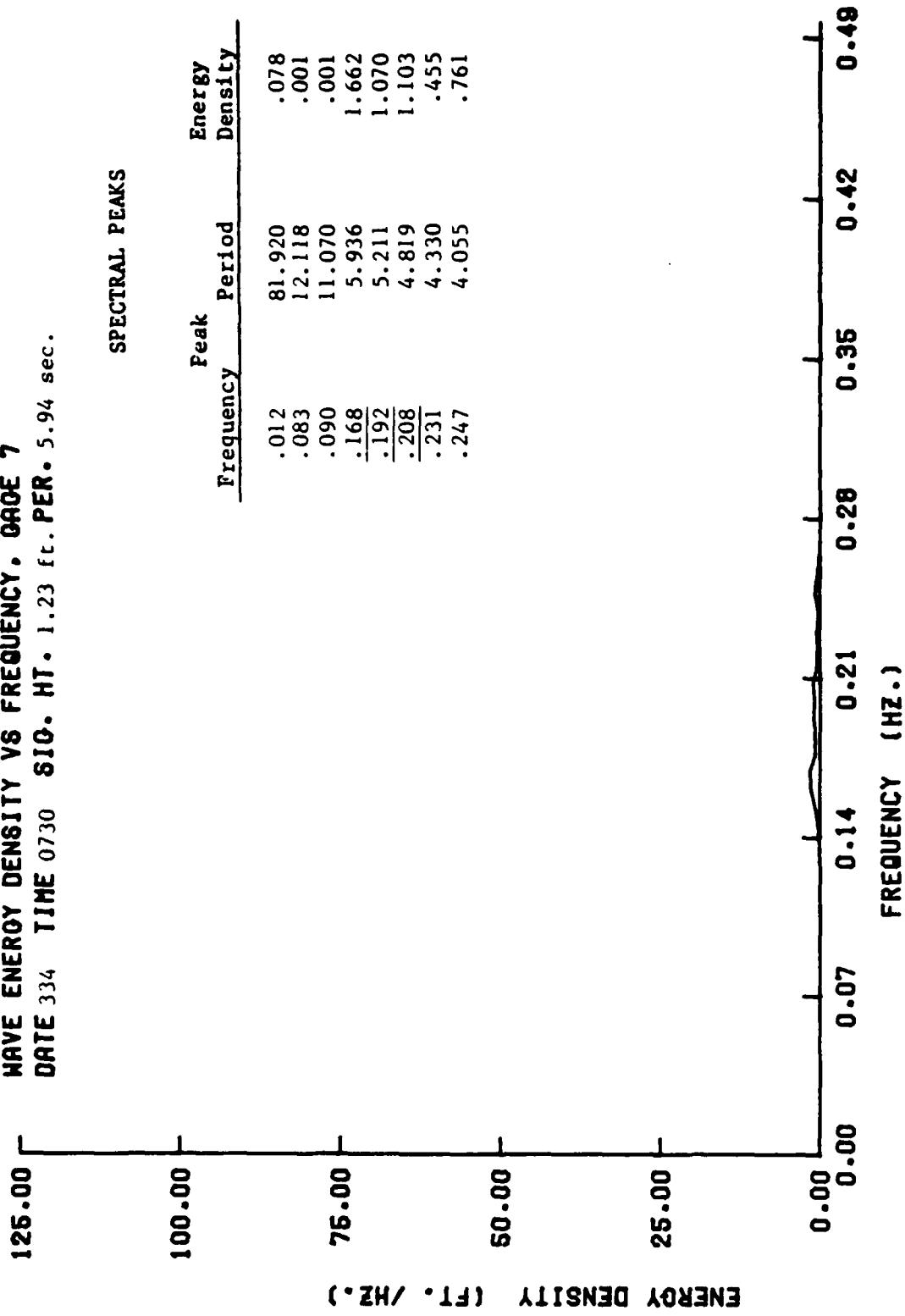




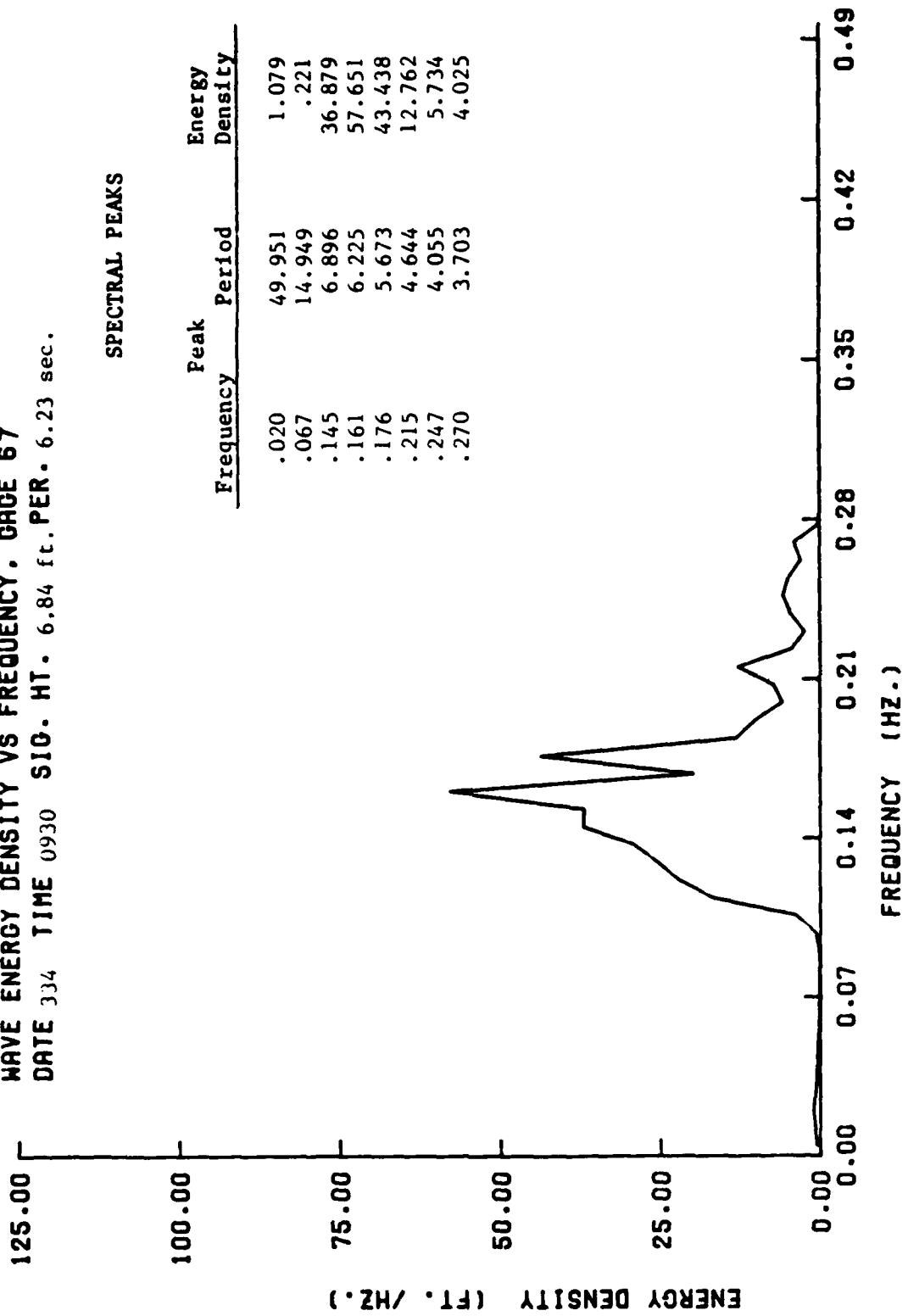
LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. CASE 67  
DATE 3/34 TIME 0730 SIG. HT. 5.89 ft. PER. 5.94 sec.



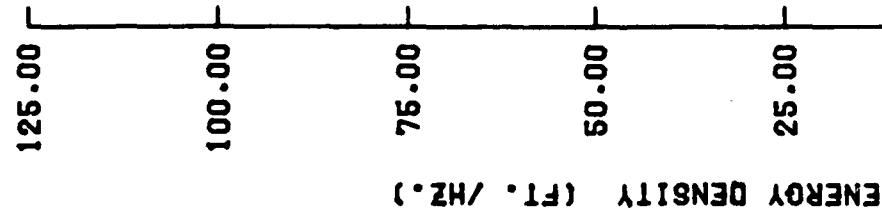
LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. DATED 7  
DATE 334 TIME 0730 \$10. HT. 1.23 ft. PER. 5.94 sec.



LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY . CAGE 67  
DATE 3/34 TIME 0930 SIG. HT. 6.84 ft. PER. 6.23 sec.

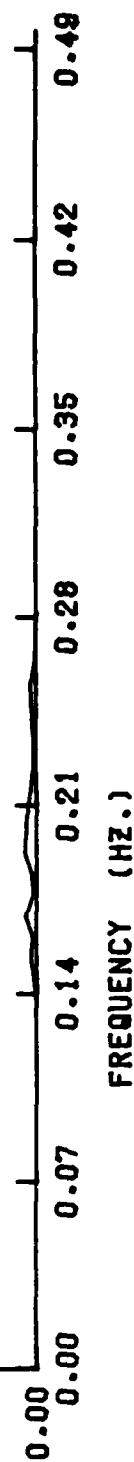


LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY, GRADE 7  
DATE 3/34 TIME 0930 SIGHT. HT. 1.19 ft. PER. 5.21 sec.

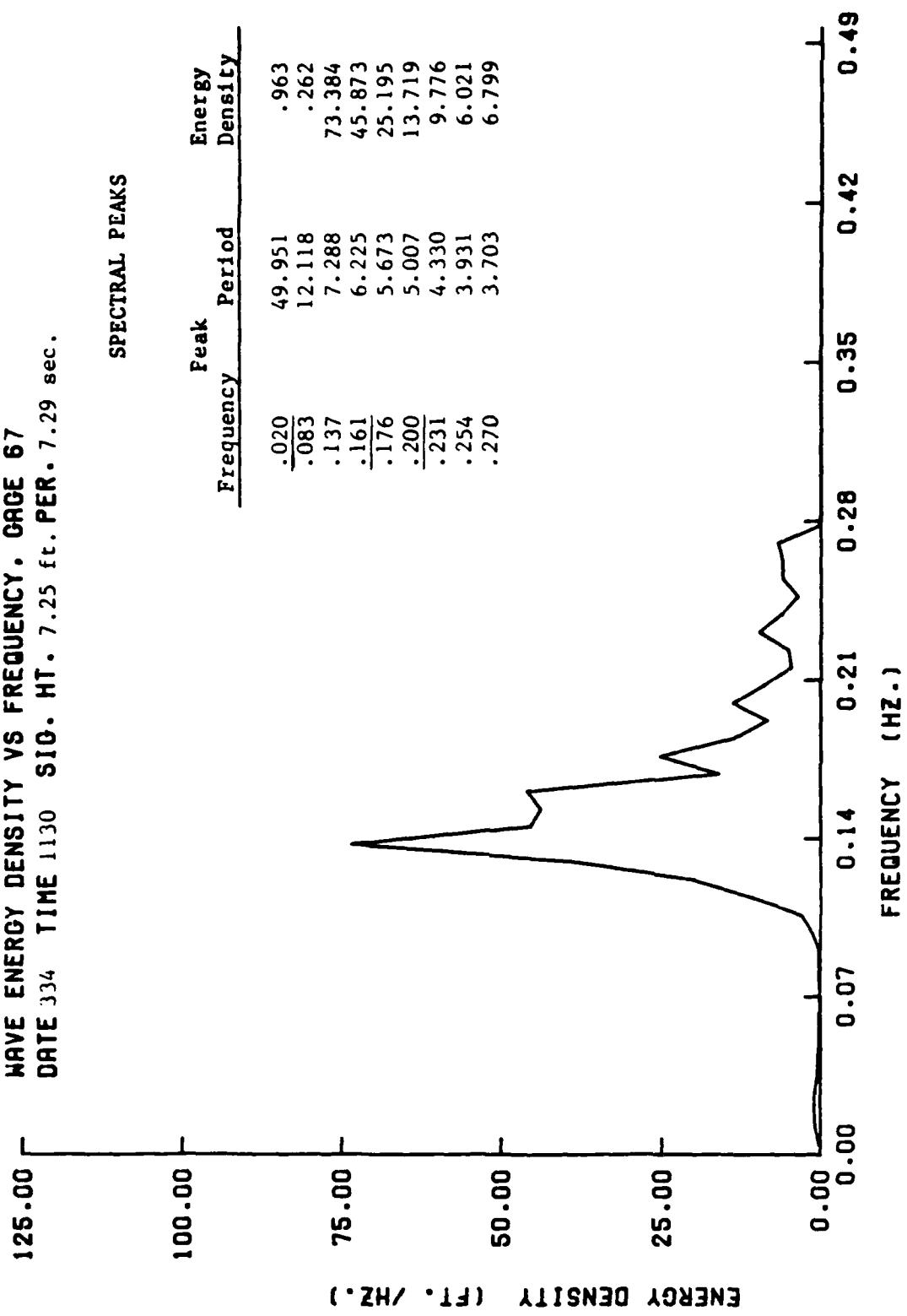


SPECTRAL PEAKS

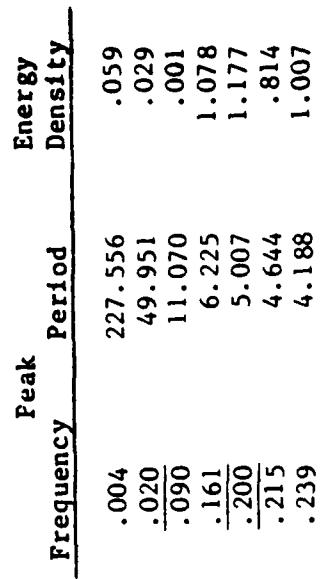
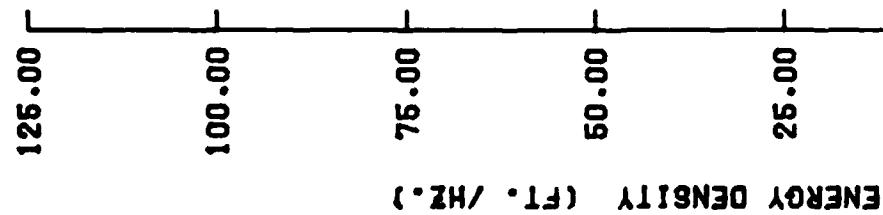
Peak Frequency	Period	Energy Density
.004	227.556	.049
.153	6.543	.731
.168	5.936	1.345
.192	5.211	1.512
.254	3.931	.688



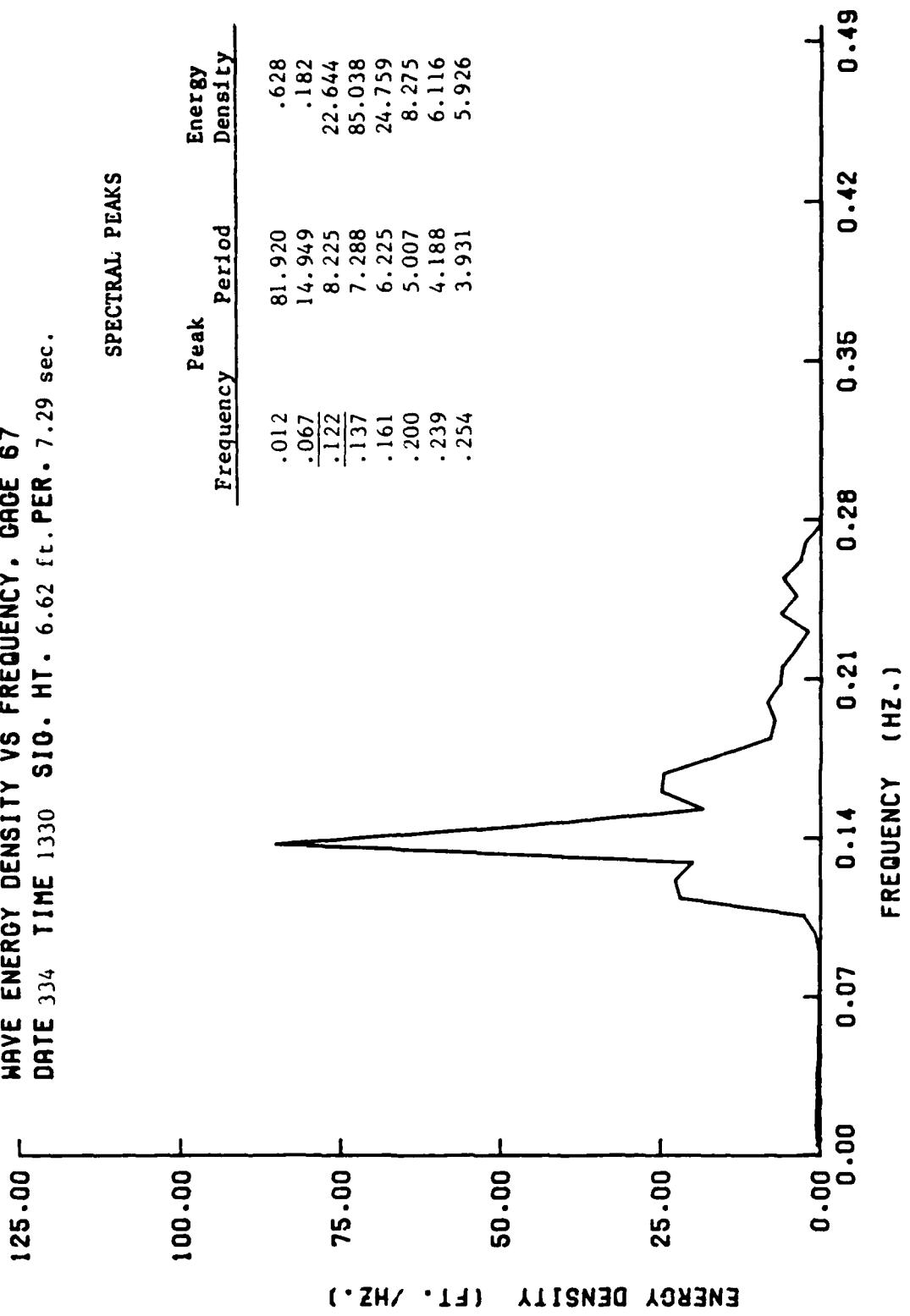
LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GAGE 67  
DATE 334 TIME 1130 SIG. HT. 7.25 ft. PER. 7.29 sec.



LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GRADE 7  
DATE 3/34 TIME 1130 SIG. HT. 1.17 ft. PER. 5.01 sec.

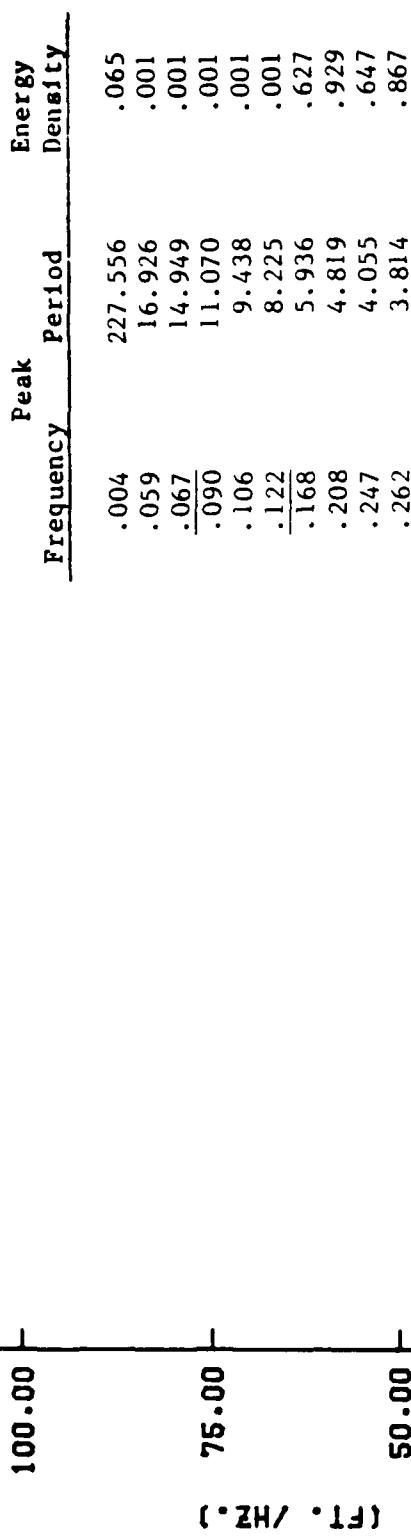


LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GAGE 67  
DATE 334 TIME 1330 SIG. HT. 6.62 ft. PER. 7.29 sec.



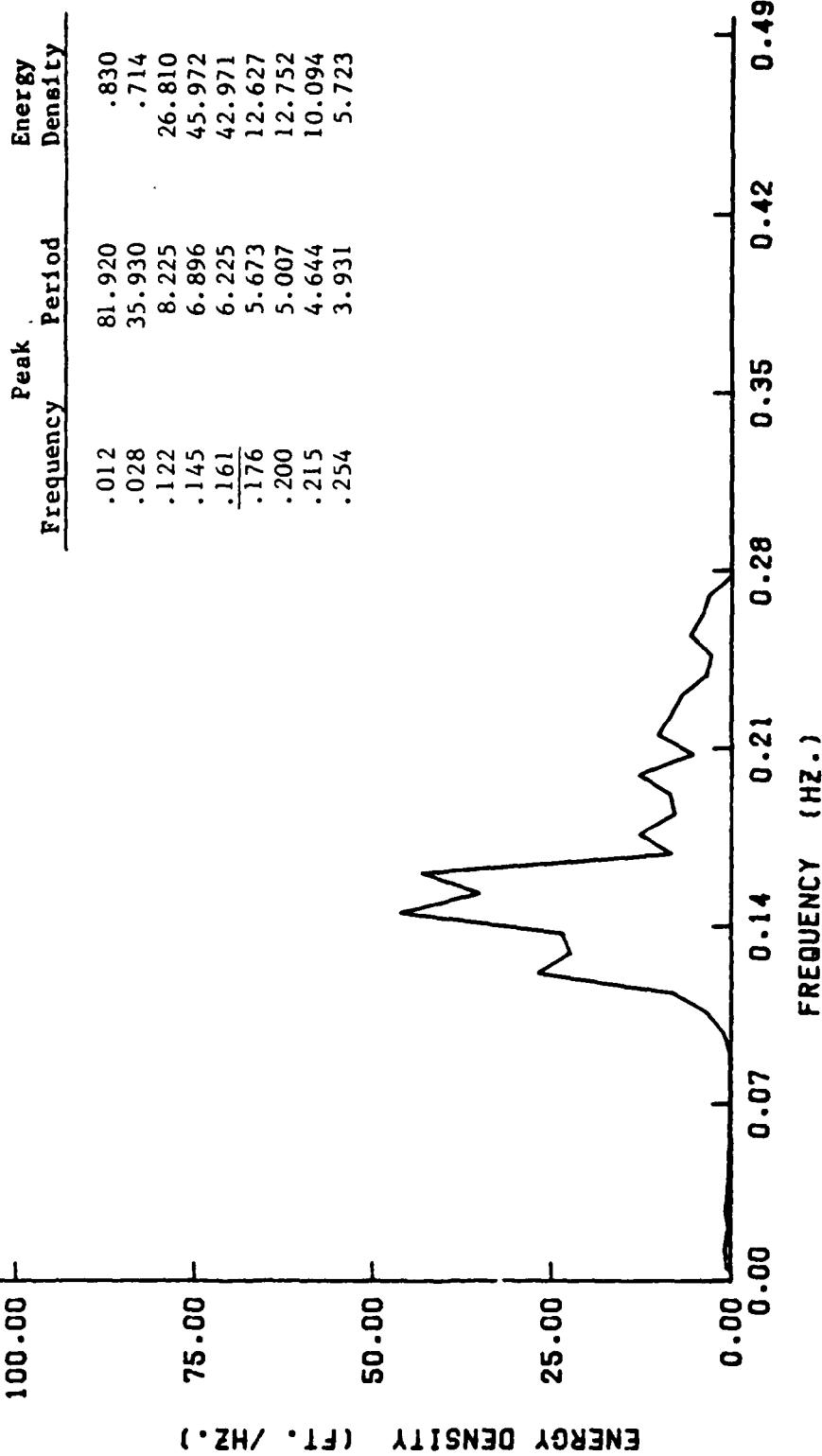
LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GRADE 7  
DATE 3/34 TIME 1330 S10. HT. 1.09 ft. PER 4.82 sec.

SPECTRAL PEAKS



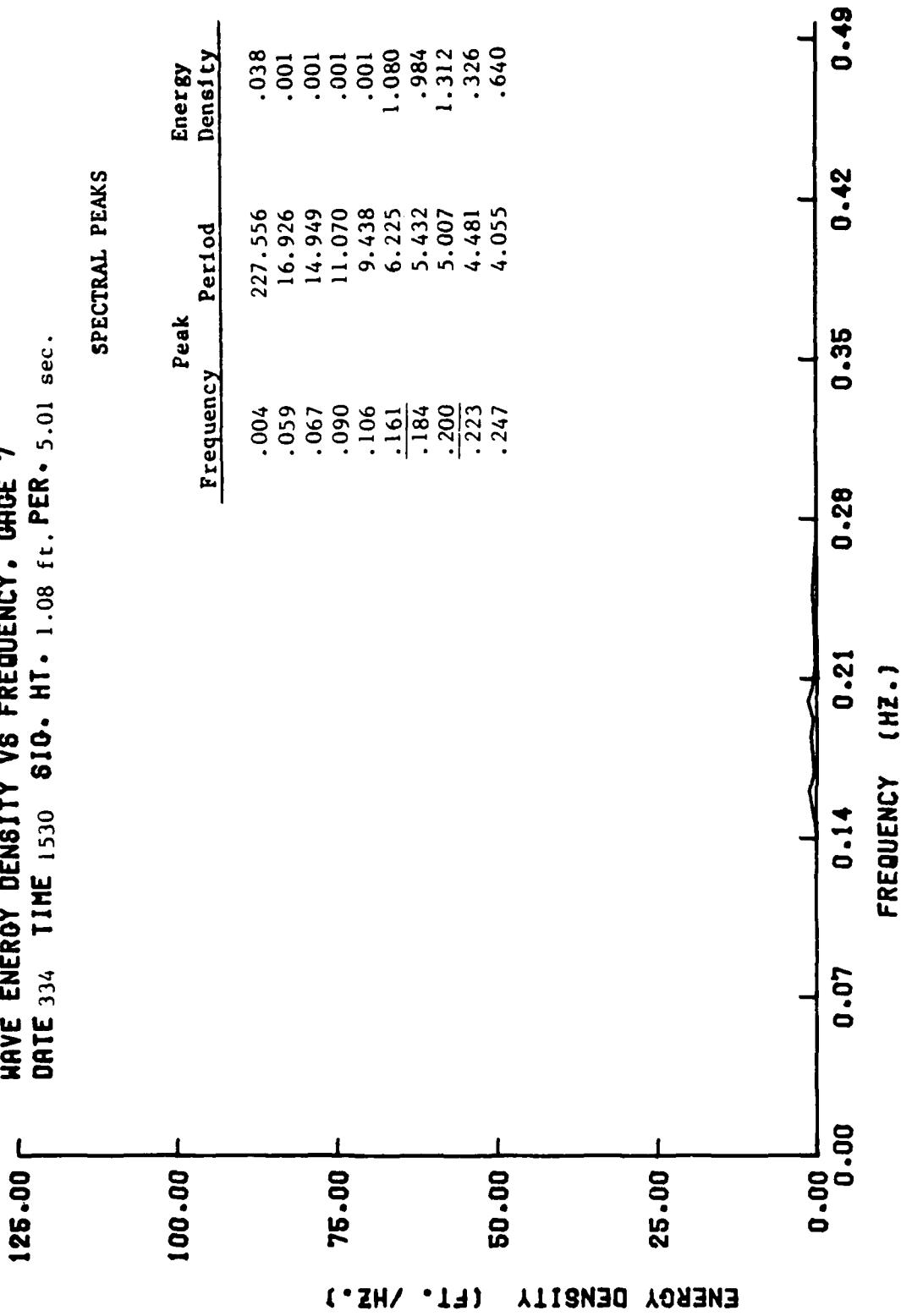
LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY, GAGE 67  
DATE 3/34 TIME 1530 SIG. HT. 6.25 ft. PER. 6.90 sec.

SPECTRAL PEAKS



LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GAGE 7  
DATE 334 TIME 1530 \$10. HT. 1.08 ft. PER. 5.01 sec.

SPECTRAL PEAKS

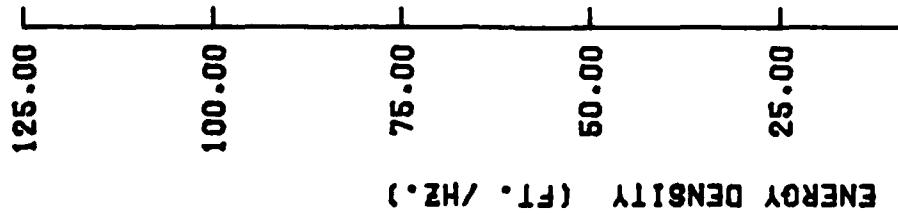


LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GAGE 67  
DATE 334 TIME 1730 SIG. HT. 5.63 ft. PER. 6.90 sec.

SPECTRAL PEAKS



LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY, BARGE 7  
DATE 334 TIME 1730 SIG. HT. 1.00 ft. PER. 5.94 sec.

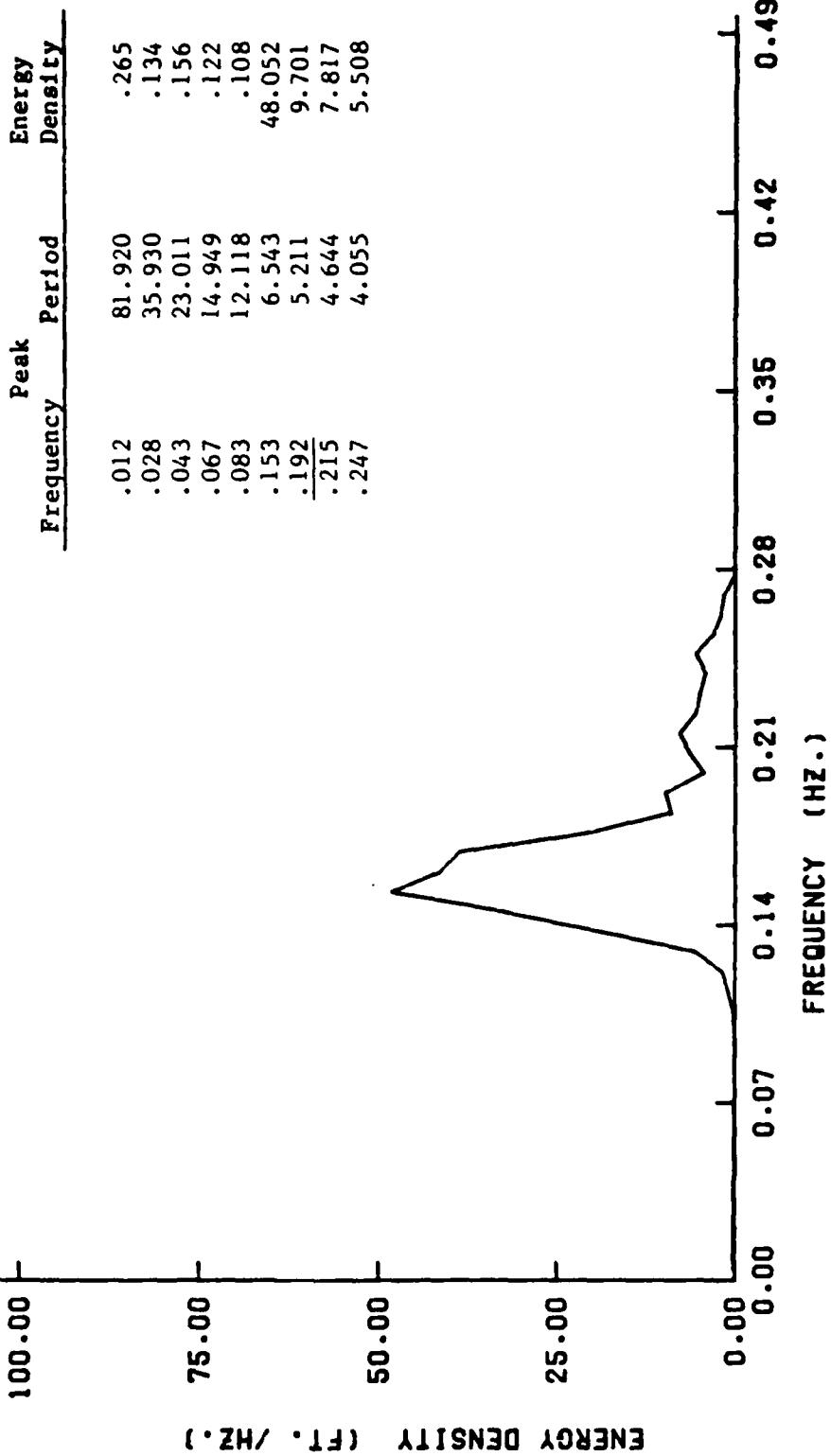


Peak Frequency	Period	Energy Density
.004	227.556	.017
.051	19.505	.001
.168	5.936	1.048
.192	5.211	.808
.208	4.819	1.046
.239	4.188	.798
.262	3.814	.458

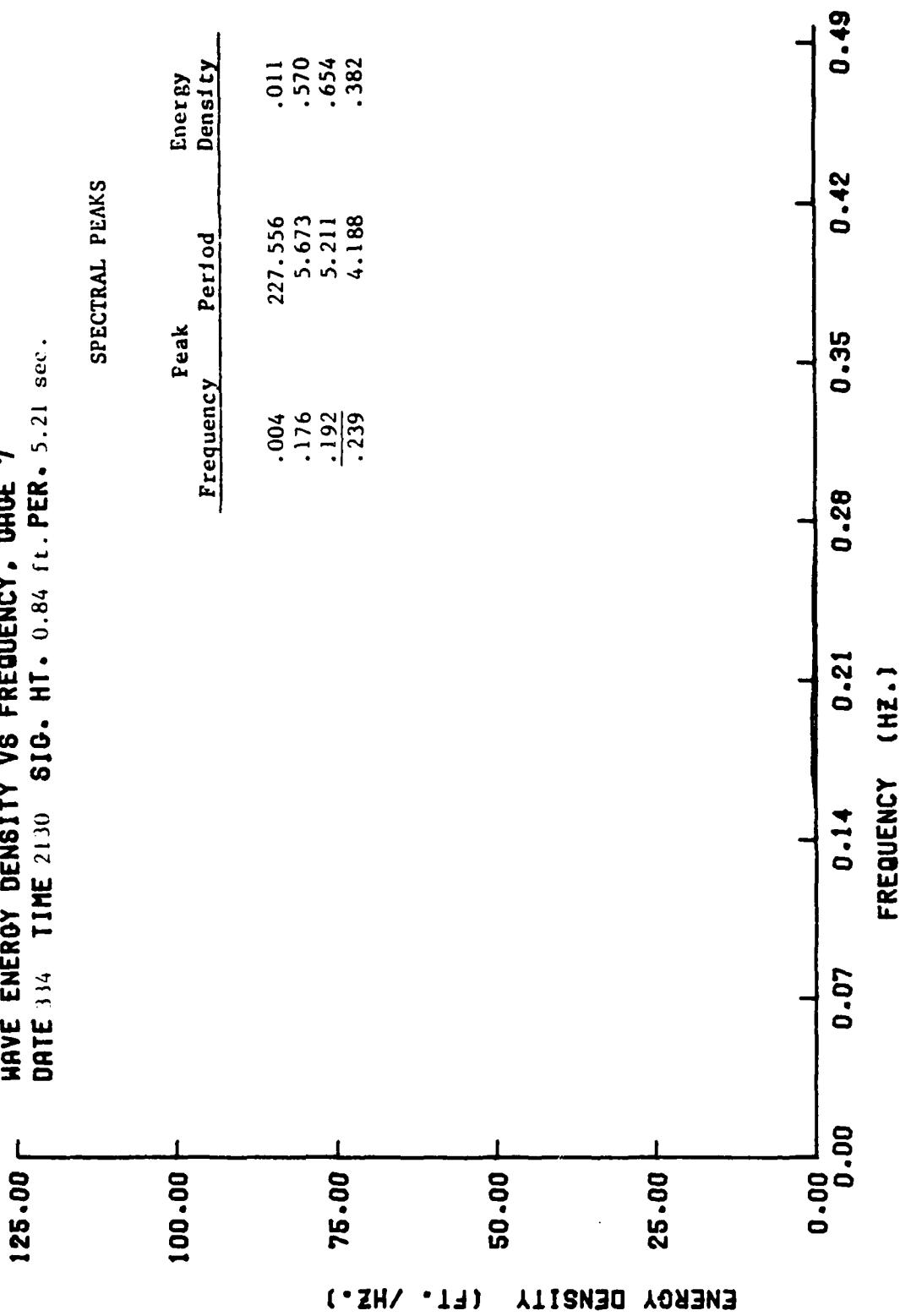
SPECTRAL PEAKS

LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GAGE 67  
DATE 3/34 TIME 2130 SIG. HT. 5.84 ft. PER. 6.54 sec.

SPECTRAL PEAKS

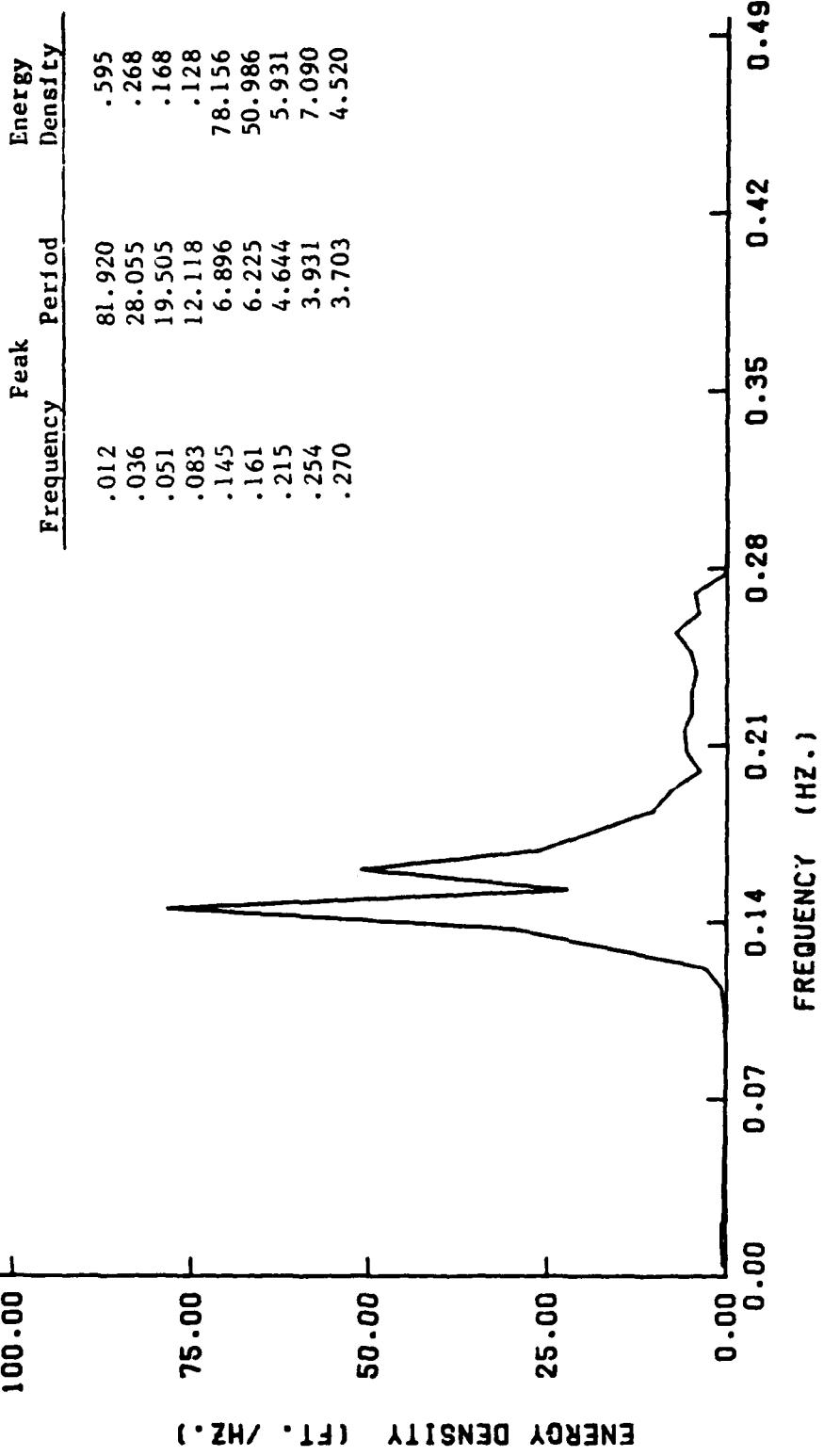


LODINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY, GRADE 7  
DATE 3/14 TIME 2130 SIG. HT. 0.84 ft. PER. 5.21 sec.

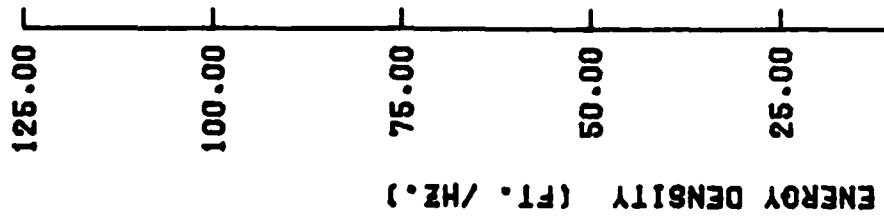


LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY, GAGE 67  
DATE 334 TIME 2330 SIG. HT. 6.28 ft. PER. 6.90 sec.

SPECTRAL PEAKS



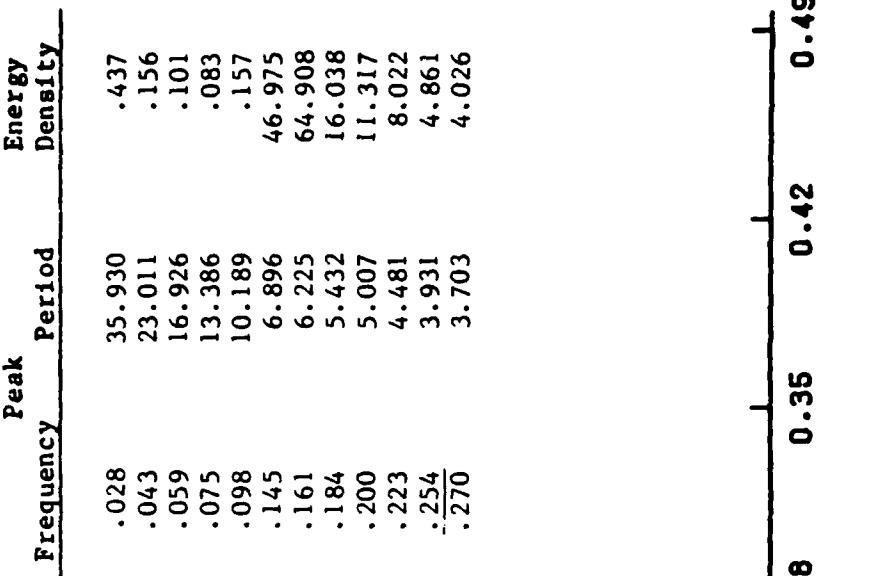
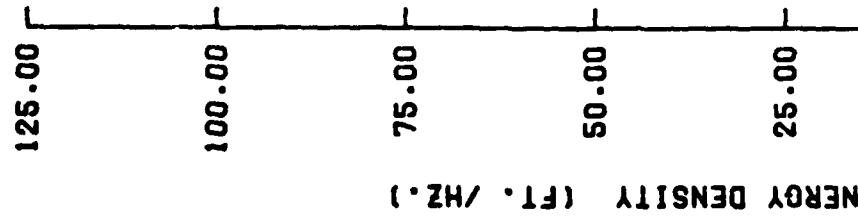
LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY, GAGE 7  
DATE 3/34 TIME 2330 SIG. HT. 0.89 ft. PER. 5.94 sec.



SPECTRAL PEAKS

Peak Frequency	Period	Energy Density
.004	227.556	.025
.153	6.543	.243
.168	5.936	1.074
.184	5.432	.711
.208	4.819	.593
.239	4.188	.667

LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. CAGE 67  
DATE 3/35 TIME 0130 SIG. HT. 6.08 ft. PER. 6.23 sec.



LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY, GAGE 7  
DATE 3/35 TIME 0130 SIG. HT. 0.91 ft. PER. 5.94 sec.

125.00

100.00

75.00

50.00

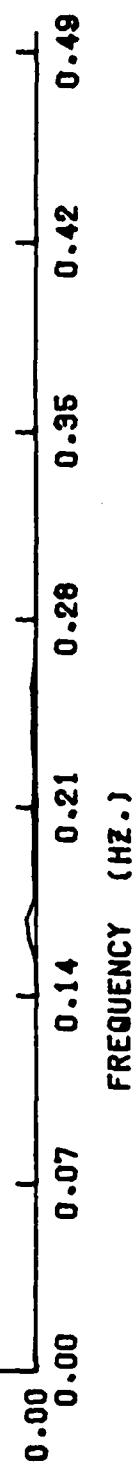
25.00

0.00

ENERGY DENSITY (FT. /HZ.)

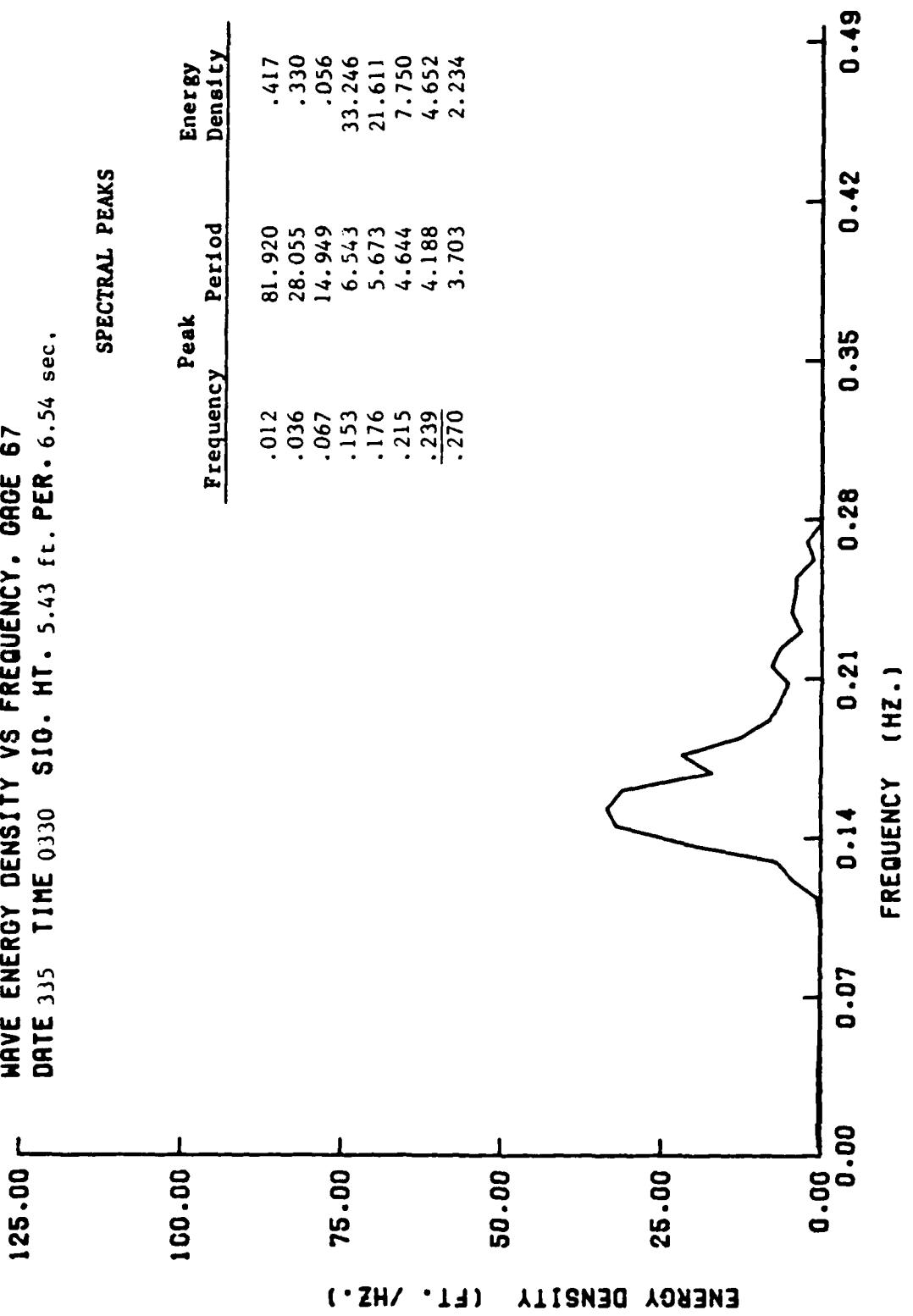
SPECTRAL PEAKS

Peak Frequency	Period	Energy Density
.004	227.556	.204
.051	19.505	.001
.168	5.936	1.260
.192	5.211	.416
.208	4.819	.442
.239	4.188	.442
.254	3.931	.568

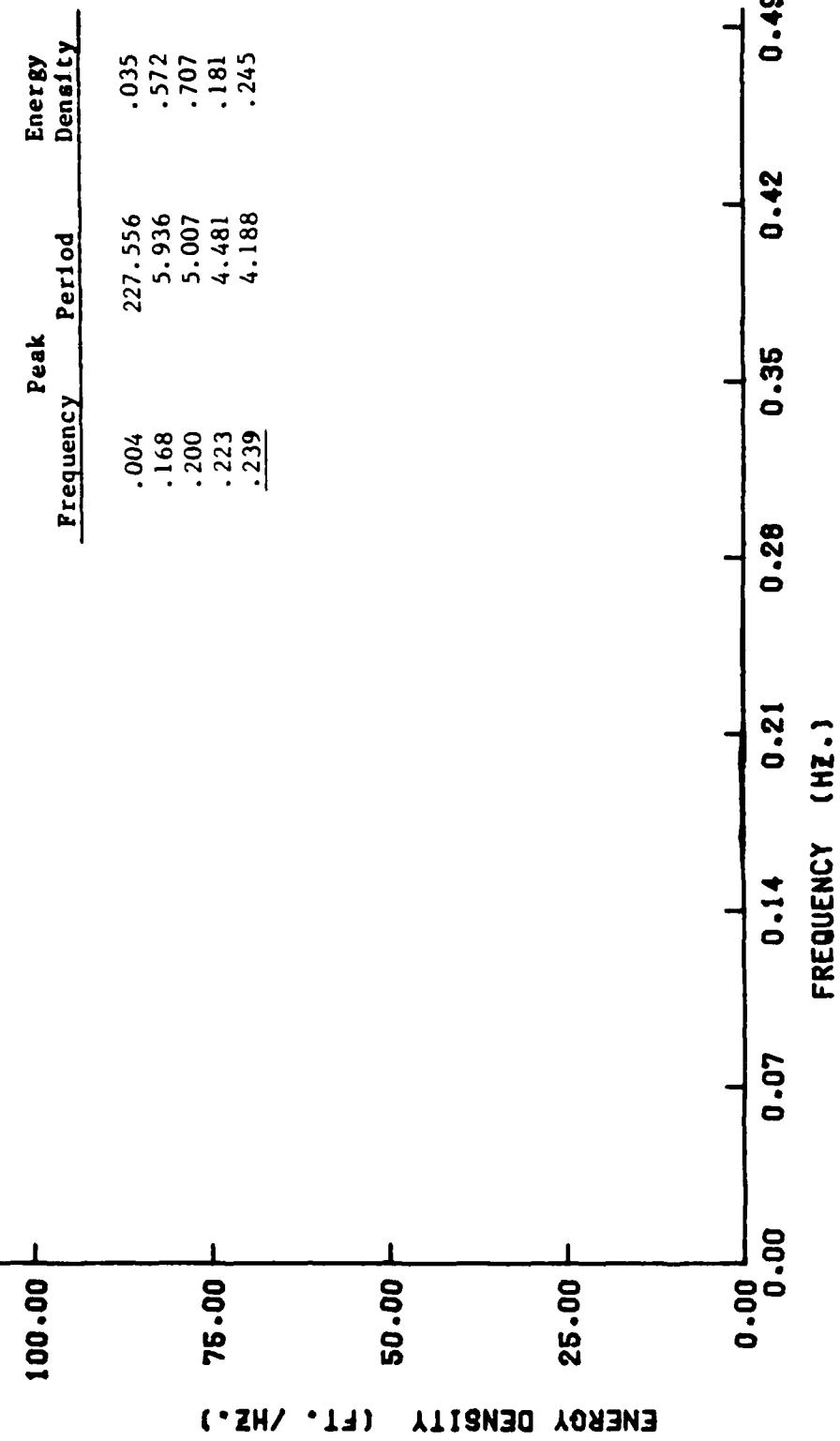
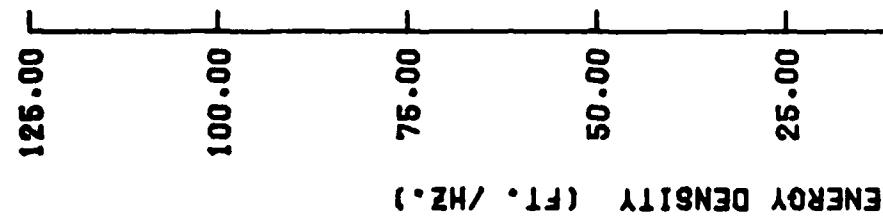


LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GAGE 67  
DATE 3/35 TIME 0330 S10. HT. 5.43 ft. PER. 6.54 sec.

SPECTRAL PEAKS



LUDINGTON HARBOR, MICHIGAN  
WAVE ENERGY DENSITY VS FREQUENCY. GAGE 7  
DATE 335 TIME 0330 SIG. HT. 0.73 ft. PER. 5.01 sec.



**END**

**FILMED**

**9-85**

**DTIC**